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An Interindustry Analysis of GRAIN PRODUCTION AND PROCESSING

Implications of Expanding Markets

U.S. DEPARTMENT OF AGRICULTURE — ECONOMIC RESEARCH SERVICE

ABSTRACT

A 65-sector input-output model describing the U.S. economy in 1967 provides the basic framework for this study. Grain producing and processing industries are analyzed in terms of their output levels and input structures in interaction with each other and with other sectors of the economy. Results reveal that the grain sectors are significantly economically interdependent.

In addition, increases in certain final-demand markets are examined for their effect on the grain producing and processing sectors. Results indicate widely varying impacts on the output levels of the grain sectors.

Key words: Input-output analysis; Interindustrial structures, 1967; Grains; Impact analysis.

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CONTENTS

TABLES

Appendix Tables

SUMMARY

U.S. industries that produce and process grain are highly interdependent with one another as well as with other sectors of the economy. For example, while about a third of the 1967 output of the wheat producing sector was distributed to final-demand markets, another third was distributed among several grain processing sectors. For every $1 of wheat output, producers had to purchase an estimated 70 cents of input from other sectors, such as the livestock and livestock products, chemical, machinery, and transportation sectors. These sectors, in turn, required materials and services from other sectors to provide the input to wheat producers. Such requirements amounted to an estimated 72 cents for every $1 of wheat produced.

Within the grain processing industry, output of the flour and rice milling sectors is distributed primarily to final-demand markets. But processors of prepared animal feeds are highly dependent on sales to intermediate users--only 20.7 percent of their total output was shipped directly to final-demand markets in 1967, while over two-thirds went to the livestock and livestock products sectors. For processors of prepared animal feeds to support an output level of $5.3 billion in 1967, almost $4.0 billion of inputs were directly purchased from other sectors of the economy. In addition, about $4.8 billion of economic activity was further generated in economic sectors that did not supply direct inputs.

Similar direct and indirect economic activity generated by the various grain sectors was analyzed using traditional input-output methodology. A 65-sector input-output model describing the U.S. economy in 1967 provides the basic framework for the study. Grain producing and processing industries are analyzed in terms of their output levels and input structures in interaction with each other and with other sectors of the economy.

In addition, increases in certain final-demand markets are examined for their absolute and relative effects on output levels and resource use in the grain producing and processing sectors. The final markets considered are total output of livestock and livestock products and bakery products, and exports of wheat and rice.

The analysis indicated that if final-market demand for livestock and livestock products were 20 percent above the 1967 level, demand for corn would increase significantly. The livestock sector would directly require additional corn inputs of $666 million and would further generate $234 million of corn output to meet the needs of other sectors directly or indirectly supplying inputs to the livestock sector. Increases in the output of other grains would range from a total of $2 million for rye producers to $150 million for sorghum producers. For grain processors, the impact would also be significant. Producers

of prepared animal feeds would experience a total output adjustment of $953 million, of which $175 million represents direct inputs to the livestock sector and $238 million represents indirect output generated. Compared with 1967 levels of oats and corn production, the relative effect of increased livestock consumption would be greater for oats producers than for corn producers. However, the value of total output adjustment for corn producers would be $900 million, compared with only $118 million for oats producers.

In general, expanding markets for grain and grain food products will lead to a number of changes in firms that produce, process, and market grain. Industries that supply inputs to such firms also will be affected.

AN INTERINDUSTRY ANALYSIS OF GRAIN PRODUCTION AND PROCESSING
Implications of Expanding Markets

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INTRODUCTION

The U.S. economy has become a highly complex and interrelated system of production and distribution. Each industry's level of output is dependent either directly or indirectly upon the output of other industries. For example, if an industry requires more chemicals to increase its output, additional inputs are required by the chemical industry to meet this increased demand. As a result, suppliers to the chemical industry must increase their production and this, in turn, places an increased demand on their suppliers. This successive chain of events continues to spread through additional sectors of the economy, slowly diminishing in intensity. The degree and diversity of interdependence among sectors is becoming more critical. Hence, investigating economic interaction among industries is important in assessing the dynamic nature of production and distribution.

Two groups of related industries, important to the economy as a whole and specifically to agriculture, are the food and feed grains industry group and the grain mill products industry group. 2/ Included in these groups are, respectively: (1) producers of wheat, rye, rice, corn, oats, barley, and sorghum, and (2) the flour milling, prepared animal feeds, blended and prepared flour, cereal preparations, wet corn milling, and rice milling industries. In 1967, sales of their products totaled over $19 billion. In terms of national income, these industries contributed nearly $6.5 billion as a result of their operations.

1/ This report is an outgrowth of the authors' masters theses. Whitman M. Chandler, Jr., in his thesis submitted to The George Washington University, Washington, D.C., developed interindustry relationships for the grain producing sectors. Edward H. Glade, Jr., established parallel relationships for the grain processing sectors in his thesis submitted to the University of Maryland, College Park, Md.

2/ In this study, the food and feed grains industry is defined to include part of Industry Group 011 and the grain mill products industry consists of Industry Group 204, as defined in the Standard Industrial Classification Manual, U.S. Bureau of the Budget, 1967.

This study employs input-output techniques to analyze economic interactions associated with these grain producing and processing sectors. Specifically, the objectives of the study are to:

--Present a current (1967) interindustry transaction table, with emphasis on each grain producing and grain processing sector and its relationship with other sectors;

--quantitatively measure the economic importance of grain producing and processing sectors by identifying and analyzing (1) their output flows and input requirements and (2) the direct and indirect effect that changes in their output have on the level of output of other sectors; and

--analyze the effect of changes in demand for products of specified industries on output levels and resource use in grain production and processing.

Methodology

The basic premise on which input-output analysis rests is that all productive activities in the economy can be divided into sectors whose interrelations can be expressed by a set of input functions. A sector is a group of economic units that are homogeneous with regard to their principal activity. The number of sectors included in an input-output model depends primarily on the availability of comparable data.

Development of the input-output system requires the construction of three basic tables: A transaction table, a direct requirements table, and a total requirements table.

The transaction table is a matrix of the dollar value, in producer prices, of the flow of goods and services among the various sectors. 3/ Within this matrix, a row represents the distribution of goods and services of any one industry to other industries, while a column shows an industry's purchases from other industries. In addition to these interindustry transactions, value added (columns) and distribution to final demand (rows) are also shown.

After the transaction table has been constructed, the direct requirements table can be derived. Direct requirements are commonly referred to as technical or input coefficients and are defined as the amount of input an industry requires from particular industries to produce $1 of output. Data requirements are computed by dividing each column entry in the transaction table by its corresponding column total.

3/ Producer prices are defined to include Federal, State, and local excise taxes collected and paid by the producers. They do not include the distribution costs which make up the difference between the price at the producer level and the price at the purchaser level. These costs appear as separate inputs from each distributive industry.

The direct requirements table does not, however, represent the total economic activity that results from additional sales to final demand. Such sales will lead to indirect as well as direct increases in the output of other sectors. Total requirements--direct and indirect--show the total expansion of output in all industries as a result of a $1 delivery of output to final demand by each sector. The basic procedure for ascertaining these total requirements is the subtraction of the direct requirements matrix from an identity matrix. The resulting matrix is then inverted to produce the total requirements table.

Most input-output or interindustry studies, particularly at the national level, have aggregated sectors to include only major industry groups. Sectors identified in a transaction table include groupings of related industries. As the level of aggregation increases, product and process identity become more obscure. This reduces the usefulness of input-output analysis for studying the economic structure of individual industries. Moreover, past national input-output tables have provided only a limited opportunity to identify and analyze the interindustry structure of detailed sectors on a current basis because of the time involved in table construction and the reliance on census data.

A 1967 transaction table, developed at Clemson University, Clemson, S.C., was used in this study as a benchmark table. It is basically an updated version of the 1958 National Transaction Table of the U.S. Department of Commerce. In the Clemson work, some sectors in the Commerce table were aggregated and others were disaggregated, which resulted in a 56-sector table with 1958 data. The table was updated to 1967 by the use of sector price and quantity indexes for that year. Results were checked against published industrial data for 1967. 4/ For the present study, four sectors of the 1967 table were disaggregated--food grains, feed grains, grain mill products, and other agricultural products. The final disaggregated transaction table was a 65 x 65 matrix representing 65 industrial sectors. A complete listing of each sector is shown in appendix table 1, along with the sector composition in terms of Standard Industrial Classification (SIC) industry codes.

Assumptions

Basic to the application of an input-output system to periods beyond the one for which it was developed are two general assumptions:

(1) The physical structure of the economy does not change. This rules out the substitution of one input for another as a result of changes in technology and/or relative prices. It implies that inputs purchased by each producing sector are a function only of the level of output of that sector.

(2) For any level of output, the technical or input coefficients remain constant. This assumption rules out changes in economies of scale. It states

4/ For a complete discussion of the methods and procedures used in developing the base table, see Robert H. Elrod, Development and Use of Updated Input-Output Tables in Economic Forecasting and Planning, Clemson Univ., Clemson, S.C., Aug. 1969, unpublished Ph.D. dissertation.

that the production function will exhibit constant returns to scale, even though the output of a sector may be a function of several inputs. Thus, a doubling of the inputs in a producing sector will double the output of that sector.

It should be noted that there are certain stability conditions for the table of technical coefficients. First, no column in the table adds to more than unity. A sum greater than one would indicate that the cost to an industry for producing $1 of output is greater than $1. Second, at least one column in the table must add to less than unity. If this were not so, total expenditures induced within the system would equal the income generated by them and no payments would be available to the factors of production.

INTERINDUSTRY RELATIONSHIPS

This section discusses the specific economic importance of grain producing and processing sectors in 1967 and the degree of their interdependence with the national economy. In addition, the analysis (1) identifies and evaluates those sectors affecting the output level of grain producers and processors and (2) determines the effect, if any, that changes in the grain sectors' output has on the output of other sectors. The analysis is based on information developed from the disaggregated transaction table and the tables of direct and total requirements.

Output Structure

The distribution of output for grain producers is shown in rows 2A, 2B, 2C, 3A, 3B, 3C, and 3D of the transaction table (app. table 2). Distribution of processed grain sales is shown in rows 17, 18, 19, and 20. These data show the dollar value of each sector's sales to each consuming sector indicated in the heads of the columns. Total intermediate sales, final-demand sales, and total output are shown on the table's last two pages (pp. 50-51). 5/

The percentage distribution of sales by grain producing and processing sectors is given in table 1 to facilitate the analysis. These data show the relative impact that sales to intermediate and final-demand markets have on the output of these sectors. While most of the output as a whole is sold to intermediate users, distribution patterns vary significantly. This indicates that the output of grain production and processing industries is primarily affected by economic conditions prevailing in different markets.

For example, in 1967, the wheat producing sector distributed 34.4 percent of its total output directly to final demand. This proportion is primarily made up of exports under Government programs and exports for dollars. A small part

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5/ Total intermediate sales represent the sum of output distributed to each consuming industry; final demand primarily includes output sold directly to persons and governments and for export; total output represents intermediate sales plus final demand sales.

Table 1.--Percentage distribution of gross output of selected food grain, feed grain, and grain mill products sectors, 1967

Distributed to--	Grain producing sectors							Grain processing sectors			
	Wheat	Rye	Rice	Corn	Oats	Barley	Sorghum	Flour and other grain mill products	Prepared animal feeds	Rice milling	Wet corn milling
	Percent							Percent			
Intermediate markets:											
Wheat	3.9	--	--	--	--	--	--	--	--	--	--
Rye	--	13.9	--	--	--	--	--	--	--	--	--
Rice	--	--	3.5	--	--	--	--	--	--	--	--
Corn	--	--	--	0.3	--	--	--	--	--	--	--
Oats	--	--	--	--	4.9	--	--	--	--	--	--
Barley	--	--	--	--	--	3.4	--	--	--	--	--
Sorghum	--	--	--	--	--	--	0.2	--	--	--	--
Livestock & livestock products	2.1	7.0	--	60.0	61.0	37.5	54.7	2.1	66.7	0.7	2.4
Ag. services, forestry, & fisheries	7.5	9.3	3.5	.8	5.9	5.5	3.7	--	--	--	--
Flour & other grain mill products	29.9	25.6	--	1.9	4.7	.8	.7	1.4	1.0	4.6	.6
Prepared animal feeds	1.7	--	--	7.0	5.8	6.8	15.3	4.7	7.3	.7	3.5
Rice milling	--	--	85.7	--	--	--	--	--	--	--	--
Wet corn milling	--	--	--	4.2	--	--	--	.2	--	--	3.2
Bakery products	--	--	--	--	--	--	--	25.3	--	--	7.5
Misc. food & kindred products	--	--	--	--	--	--	--	1.6	.2	--	5.6
Other food & kindred products	--	11.6	--	1.0	--	22.2	.2	4.7	.6	5.4	34.6
Broad & narrow fabrics & yarn & thread mills	--	--	--	--	--	--	--	--	--	--	5.3
Paper & allied products	--	--	--	--	--	--	--	--	--	--	13.4
Chemicals etc.	.4	--	--	--	--	--	.1	--	.2	--	6.9
Transportation & warehousing	.2	--	.2	.4	.2	.2	.1	.5	--	.2	--
Wholesale & retail trade	--	--	--	--	--	--	--	.8	1.6	.2	.2
Finance, insurance, real estate, & rental	17.5	23.3	8.6	2.3	17.2	16.8	10.7	--	--	--	--
Federal Gov't. enterprises	2.4	2.3	--	.6	.9	--	-1.0	2.7	--	11.9	--
All other	--	--	--	--	--	--	--	3.5	1.7	1.4	4.4
Final demand	34.4	7.0	-1.5	21.5	-0.6	6.8	15.3	52.5	20.7	74.9	12.4
Total outputs	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

is made up of inventory changes. The largest industrial market for the wheat producing sector is the flour and other grain mill products sector, which purchased 29.9 percent of total 1967 wheat output.

In contrast with wheat producers, rye producers distributed only 7.0 percent of their output to final demand. The output level of rye producers is highly correlated with economic activity of intermediate markets, particularly the flour and other grain mill products sector, which purchased 25.6 percent of total 1967 rye output. Since the flour and other grain mill products sector distributed 52.5 percent of its total output directly to final markets, it may be concluded that the value of output for wheat and rye producers is determined largely by consumer demand for packaged flour, cereal, and flour mixes and by export demand for these products.

The distribution of rice producers' output presents an entirely different picture. Of their output, 85.7 percent was distributed to rice millers. This is not surprising since rough rice is a primary input to the rice milling sector. The fact to be noted here is that nearly 75 percent of total production in the rice milling sector was delivered directly to final-demand markets, primarily for export. Consequently, export demand for milled rice is the main factor affecting the level of rice mill output, which--in turn--greatly affects the output level for rice producers. The negative delivery of rice to final demand in 1967 resulted from a net decline in inventories.

For feed grains--represented by the corn, oats, barley, and sorghum sectors in table 1--the largest share of output was distributed to the livestock and livestock products sector, primarily for use in animal feed. Distribution of the remaining output varies significantly among sectors.

In the corn producing sector, for example, 21.5 percent of total output was delivered to final demand, primarily for export. Thus, about 82 percent of the total corn output is purchased by only two sectors--livestock products and final demand. Oats producers distributed 61.0 percent of their output to the livestock products sector alone. It may be concluded that the output of the corn and oats sectors is highly correlated with economic activity of intermediate markets, especially that of the livestock products sector.

Although the level of output in the barley and sorghum sectors is greatly dependent on activities of intermediate markets, the output has a broader distribution among these markets. Deliveries of barley to final demand represent only 6.8 percent of total output, which indicates the importance of intermediate markets. The sorghum sector delivered 84.7 percent of its output to intermediate markets and 15.3 percent to final demand.

In the grain mill processing industry, outputs of the flour and rice milling sectors are primarily dependent upon final-demand requirements. In contrast, processors of prepared animal feeds are highly dependent upon sales to intermediate users--only 20.7 percent of their total output was shipped directly to final demand in 1967. The livestock and livestock products sector consumed over two-thirds of all prepared animal feed output. Hence, consumer demand for livestock and livestock products primarily determines the output level in the prepared animal feeds sector.

Output of the wet corn milling sector reaches more industrial users than that of the other grain processing industries. Almost 88 percent of all output is utilized in further production before reaching final markets. Moreover, the percentage distribution of output is more uniform. The largest single market is the food processing industry, accounting for over 34 percent of total output.

Although the grain mill products industry group is characterized by firms performing similar functions, output of each of the four sectors reaches the ultimate consumer in significantly different form. Data in table 1 clearly show the diversity of output flows from the grain processing sectors. The same may be said for the food and feed grains industry group--similar functions are performed, but products of each sector reach the ultimate consumer in distinctly different ways.

Direct Input Requirements and Output Changes

Now that the output structure of each grain producing and processing industry has been established, it is necessary to examine the direct input requirements necessary to support the output. The matrix of direct requirements or technical coefficients is used for this analysis.

Distribution of inputs purchased by the grain producing sectors and requirements from value-added categories are shown in columns 2A, 2B, 2C, 3A, 3B, 3C, and 3D of the transaction table (app. table 2). Corresponding data for the grain processing sectors are shown in columns 17, 18, 19, and 20. These data represent the dollar value of purchases from sectors named at the beginning of the rows. For example, for the prepared animal feeds sector (col. 18, p. 34) to support a level of output of \$5.3 billion in 1967, almost \$4.0 billion of intermediate purchases were required. Value added by the prepared animal feeds sector accounts for the difference (about \$1.4 billion) (see last three entries in col. 18, p. 35).

The direct unit cost structure in 1967 for the grain producing and processing sectors is shown in tables 2 and 3, respectively. For components of each sector, these tables show the inputs required to produce \$1 of output. For the rye sector to produce \$1 of output, it requires almost 14 cents of its own production, over 32 cents from livestock products, almost 3 cents from maintenance and repair construction, and other purchases as itemized. Payments to the factors of production, as shown by the value-added row, account for about 12 cents of every dollar of output.

For food grain producers as a whole, about 75 percent of the value of production is used for purchases of intermediate inputs. Only 25 percent is retained for payments to factors of production. The large proportion of intermediate purchases indicates a high degree of interdependence with other sectors of the economy. This is especially true for the rye sector, which uses almost 89 percent of the value of its output for purchases of intermediate inputs.

Feed grain producers, as a group, are also highly interrelated with other sectors of the economy, as indicated by the large expenditure of about 68 percent of the value of production for intermediate inputs. This dependency on other sectors is not as great as for the food grain sector, however.

Table 2.--Direct input requirements of the food and feed grain producing sectors per $1 of output, 1967

Item	Wheat	Rye	Rice	Corn	Oats	Barley	Sorghum
	Dollars						
Wheat	0.039	--	--	--	--	--	--
Rye	--	.139	--	--	--	--	--
Rice	--	--	.035	--	--	--	--
Corn	--	--	--	*	--	--	--
Oats	--	--	--	--	.049	--	--
Barley	--	--	--	--	--	.034	--
Sorghum	--	--	--	--	--	--	*
Livestock products	.160	.325	.029	.087	.199	.150	.138
Forestry, fisheries, & services	.046	.023	.055	.030	.025	.025	.028
Stone & clay mining	--	--	--	.006	.006	.006	.005
Maintenance & repair construction	.023	.023	.026	.027	.022	.023	.024
Chemicals etc.	.045	.023	.053	.063	.054	.055	.059
Petroleum refining & related products	.041	.023	.048	.055	.047	.049	.051
Rubber & miscellaneous plastic products	--	--	--	.010	.009	.008	.010
Machinery, except electrical	.011	*	.013	.014	.013	.013	.013
Transportation & warehousing	.012	.023	.015	.019	.016	.017	.019
Communications & utilities	.013	.023	.015	.018	.015	.015	.017
Wholesale & retail trade	.035	.046	.044	.056	.047	.049	.052
Finance, insurance, real estate, & rental	.194	.139	.238	.176	.150	.155	.165
Lodging, personal, & business services	.054	.046	.066	.064	.054	.055	.060
Gross imports	*	.046	--	*	*	.021	*
All other sectors	.026	*	.028	.020	.018	.014	.019
Value added	.301	.116	.335	.350	.275	.311	.337
Total inputs	1.000	1.000	1.000	1.000	1.000	1.000	1.000

*Less than $0.001.

Table 3.--Direct input requirements of the grain mill products sectors per $1 of output, 1967

Item	Flour & other grain mill products	Prepared animal feeds	Rice milling	Wet corn milling
	Dollars			
Wheat	0.179	0.008	--	--
Rye	.003	--	--	--
Rice	--	--	.692	--
Corn	.025	.072	--	.280
Oats	.008	.007	--	--
Barley	.001	.006	--	--
Sorghum	.001	.026	--	--
Flour & other grain mill products	.014	.037	--	.010
Prepared animal feeds	.013	.073	--	.001
Rice milling	.006	.001	--	--
Wet corn milling	.001	.005	--	.032
Miscellaneous food & kindred products	.031	.189	--	.016
Other food & kindred products	.047	.043	--	.012
Miscellaneous fabricated textile products	.011	.013	.041	--
Paper & allied products	.038	.014	.016	.005
Chemicals etc.	*	.033	--	.010
Fabricated metal products	.002	.022	--	--
Transportation & warehousing	.126	.082	.087	.068
Communications & utilities	.009	.012	.005	.014
Wholesale & retail trade	.055	.045	.073	.048
Financial, insurance, real estate, & rental	.010	.010	.007	.012
Lodging, personal, & business services	.048	.018	.014	.010
Gross imports	.003	.004	--	.025
All other sectors	.016	.009	.015	.035
Value added	.353	.271	.050	.422
Total inputs	1.000	1.000	1.000	1.000

*Less than $0.001.

Consequently, a greater proportion of the value of total output is retained for payments to the factors of production. The value added in production is about 32 percent for feed grains, compared with 25 percent for food grains. Also, the payments for intermediate inputs are more evenly distributed to the separate feed grain sectors than to the food grain sectors.

For grain processors as a group, about 70 percent of their 1967 gross receipts, or value of output, went for purchases of intermediate inputs that were "used up" in the annual production period. About 30 percent was retained for payments to the factors of production.

Since the grain producing and grain processing sectors are strongly interrelated with each other and with other sectors of the economy, changes in their output levels affect production levels in many other sectors. The direct effect of these changes can be traced by using the data in tables 2 and 3. For example, if the output of the wet corn milling sector were to increase $1 million, what would be the direct impact on other sectors of the economy? By referring to column 4 in table 3, the reader can see that wet corn millers would require an additional $32,000 ($1,000,000 x .032) of their own production; $280,000 ($1,000,000 x .280) of corn from feed grain producers; and $10,000 ($1,000,000 x .010) of output from the flour and other grain mill products sector; and so on down the column. A total of $578,000 additional production from all sectors would be required directly for the $1-million increase in wet corn milling production.

Because input requirements and output patterns differ among sectors, changes in demand for each sector's products affect the absolute level of output of each supplying industry to a different extent. An understanding of the nature of overall demand increases for final products of industries supplying inputs to grain producing and processing sectors will facilitate the investigation of potential impacts on their own level of operation.

Total Input Requirements and Output Changes

The above discussion concerned only the direct inputs required by the grain producing and processing sectors and the direct impact of changes in their output levels on industries supplying inputs. The direct impacts do not include the many and sometimes significant indirect effects of changes in demand. A complete input-output analysis considers the total effects of changes in demand--that is, both the direct and indirect production required within each sector of the economic system to support an increase in total output of one particular sector. A matrix of total requirements includes both direct and indirect requirements and is used for the following analysis.

The direct, indirect, and total effects of a $1 delivery to final demand for the food grain producing, feed grain producing, and grain processing sectors are shown in tables 4, 5, and 6, respectively. Data were developed from the total requirements table (the 65 x 65 inverse matrix). The direct inputs required were presented in tables 2 and 3. The total outputs required are obtained from the total requirements matrix. They show the total output required from each sector (row) to support a $1 delivery to final demand by the sector named in the column.

Table 4.--Direct, indirect, and total effects per dollar delivery to final demand by the food grain producing sectors, 1967

Item	Wheat			Rye			Rice		
	Direct input required	Indirect output generated	Total output required	Direct input required	Indirect output generated	Total output required	Direct input required	Indirect output generated	Total output required
	Dollars								
Wheat	0.039	1.007	1.046	--	0.005	0.005	--	0.005	0.005
Rye	--	*	*	.139	1.023	1.162	--	*	*
Rice	--	*	*	--	*	*	.035	1.002	1.037
Corn	--	.027	.027	--	.057	.057	--	--	.007
Oats	--	--	*	--	.008	.008	--	--	*
Barley	--	--	*	--	*	*	--	--	*
Sorghum	--	.005	.005	--	.010	.010	--	--	*
Livestock products	.160	.058	.218	.325	.149	.474	.029	.022	.051
Forestry, fisheries, & services	.046	.009	.055	.023	.016	.039	.055	.005	.060
Stone & clay mining	*	*	*	*	*	*	*	*	*
Maintenance & repair construction	.023	.025	.048	.023	.032	.055	.026	.026	.052
Chemicals etc.	.045	.035	.080	.023	.038	.061	.053	.033	.086
Petroleum refining & related products	.041	.020	.061	.023	.026	.049	.048	.018	.066
Rubber & miscellaneous plastic products	.008	.006	.014	*	.006	.006	.008	.007	.015
Machinery, except electrical	.011	.011	.022	*	.009	.009	.013	.012	.025
Transportation & warehousing	.012	.037	.049	.023	.051	.074	.015	.031	.046
Communications & utilities	.013	.035	.048	.023	.044	.067	.015	.035	.050
Wholesale & retail trade	.035	.037	.072	.046	.058	.104	.044	.029	.073
Finance, insurance, real estate, & rental	.194	.083	.277	.139	.109	.248	.238	.080	.318
Lodging, personal, & business services	.054	.042	.096	.046	.053	.099	.066	.042	.108
Gross imports	*	.021	.021	.046	.031	.077	--	.018	.018
All other sectors	.012	.256	.268	*	.324	.324	.028	.226	.254
Total	.699	1.717	2.416	.884	2.050	2.934	.665	1.584	2.249

*Less than $0.001.

Table 5.--Direct, indirect, and total effects per dollar delivery to final demand by the feed grain producing sectors, 1967

Item	Corn			Oats			Barley			Sorghum		
	Direct input required	Indirect output generated	Total output required	Direct input required	Indirect output generated	Total output required	Direct input required	Indirect output generated	Total output required	Direct input required	Indirect output generated	Total output required
	Dollars											
Corn	*	1.016	1.017	--	0.032	0.032	--	0.024	0.024	--	0.022	0.022
Oats	--	*	*	.049	1.007	1.056	--	*	*	--	*	*
Barley	--	*	*	--	*	*	.034	1.003	1.037	--	*	*
Sorghum	--	*	*	--	.006	.006	--	*	*	*	1.006	1.006
Livestock products	.087	.030	.117	.199	.006	.265	.150	.050	.200	.138	.042	.180
Forestry, fisheries, & services	.030	.004	.034	.025	.008	.033	.025	.007	.032	.028	.005	.033
Stone & clay mining	.006	.002	.008	.006	.002	.008	.006	.002	.008	.005	.002	.007
Maintenance & repair construction	.027	.021	.048	.022	.024	.046	.023	.023	.046	.024	.022	.046
Chemicals etc.	.063	.036	.099	.054	.041	.095	.055	.037	.092	.059	.035	.094
Petroleum refining & related products	.055	.018	.073	.047	.023	.070	.049	.020	.069	.051	.019	.070
Rubber & miscellaneous plastic products	.010	.006	.016	.009	.007	.016	.008	.007	.015	.010	.006	.016
Machinery, except electrial	.014	.013	.027	.013	.013	.026	.013	.012	.025	.013	.012	.025
Transportation & warehousing	.019	.035	.054	.016	.042	.058	.017	.037	.054	.019	.037	.056
Communication & utilities	.018	.036	.054	.015	.038	.053	.015	.035	.050	.017	.035	.052
Wholesale & retail trade	.056	.031	.087	.047	.042	.089	.049	.036	.085	.052	.034	.086
Finance, insurance, real estate, & rental	.176	.069	.245	.150	.082	.232	.155	.074	.229	.165	.070	.235
Lodging, personal, & business services	.064	.040	.104	.054	.045	.099	.055	.041	.096	.060	.040	.100
Gross imports	*	.021	.022	*	.028	.028	.021	.023	.044	*	.023	.023
All other sectors	.022	.241	.263	.018	.281	.299	.014	.254	.268	.019	.253	.272
Total	.650	1.620	2.270	.725	1.788	2.513	.689	1.692	2.381	.663	1.665	2.328

*Less than $0.001.

Table 6.--Direct, indirect, and total effects per dollar delivery to final demand by the grain mill products sectors, 1967

Item	Flour and other grain mill products			Prepared animal feeds			Rice milling			Wet corn milling		
	Direct input required	Indirect output generated	Total output required	Direct input required	Indirect output generated	Total output required	Direct input required	Indirect output generated	Total output required	Direct input required	Indirect output generated	Total output required
	Dollars											
Wheat	0.179	0.012	0.191	0.008	0.010	0.018	--	*	*	--	*	*
Rye	*	*	*	--	*	*	--	*	*	--	*	*
Rice	--	*	*	--	*	*	.692	.026	.718	--	*	*
Corn	.025	.011	.036	.072	.016	.088	--	.005	.005	.280	.016	.296
Oats	.008	.002	.010	.007	.003	.010	--	*	*	--	*	*
Barley	*	*	*	.006	.001	.007	--	*	*	--	*	*
Sorghum	*	*	*	.026	.003	.029	--	*	*	--	*	*
Flour & other grain mill products	.014	1.002	1.016	.037	.006	.043	--	*	*	.010	.001	.011
Prepared animal feeds	.013	.010	.023	.073	1.014	1.087	--	.005	.005	*	.007	.007
Rice milling	.006	--	.006	*	*	*	--	1.000	1.000	--	--	--
Wet corn milling	*	*	*	.005	.003	.008	--	*	*	.032	1.002	1.034
Misc. food & kindred products	.031	.011	.042	.189	.042	.231	--	*	*	.016	.005	.021
Other food & kindred products	.047	.015	.062	.043	.024	.067	--	.005	.005	.012	.008	.020
Misc. fabricated textile products	.011	.003	.014	.013	.004	.017	.041	.006	.047	--	*	*
Paper & allied products	.038	.029	.067	.014	.029	.043	.016	.023	.039	.005	.013	.018
Chemicals etc.	*	.031	.031	.033	.042	.075	--	.066	.066	.010	.037	.047
Fabricated metal products	*	.014	.014	.022	.021	.043	--	.012	.012	--	.009	.009
Transportation & warehousing	.126	.045	.171	.082	.065	.147	.087	.048	.135	.068	.036	.104
Communications & utilities	.009	.034	.043	.012	.038	.050	.005	.049	.054	.014	.031	.045
Wholesale & retail trade	.055	.041	.096	.045	.057	.102	.073	.063	.136	.048	.039	.087
Finance, insurance, real estate, & rental	.010	.094	.104	.010	.078	.088	.007	.242.	.249	.012	.092	.104
Lodging, personal, & business services	.048	.046	.094	.018	.053	.071	.014	.089	.103	.010	.044	.054
Gross imports	*	.026	.026	*	.032	.032	--	.022	.022	.025	.016	.041
All other sectors	.016	.305	.321	.009	.365	.374	.014	.419	.433	.035	.237	.274
Total	.647	1.735	2.382	.725	1.907	2.632	.949	2.093	3.042	.578	1.599	2.177

*Less than $0.001.

To illustrate the total effects: The economic activity that the wheat sector generates includes a total output of 21.8 cents from livestock products; 5.5 cents from forestry, fisheries, and services; 4.9 cents from transportation and warehousing; and nearly \$1.05 of its own production (table 4). This \$1.05 represents the \$1 delivery to final demand plus the intrasector requirements (direct and indirect) necessary to support this delivery. The last entry in the "total output required" column represents the total expansion of output in the economy resulting from the wheat sector delivering \$1 of output to final demand. It is essentially an output multiplier which indicates that for every dollar of final product delivered by the wheat sector, about \$2.42 of total economic activity is generated.

Data for the indirect output generated were obtained by subtracting direct inputs required from total output generated. The indirect output data are perhaps the most relevant in this particular analysis. Indirect output represents the value of production indirectly required to support the output of other sectors that provide inputs to the sector named in the column. In other words, they show economic activity indirectly generated by the sector named in the column as a result of a \$1 increase in output.

Referring again to the wheat sector in table 4: A direct 16-cent input from the livestock products sector is required to produce \$1 of wheat output. Because of this requirement, an additional 5.8 cents in economic activity is generated in the livestock products sector. This represents the value of production in the livestock products sector required to support the increased output of all sectors other than the wheat sector.

Often the indirect output generated is of greater magnitude than the direct input required. The transportation and warehousing sector, for example, provides over three times as much output to sectors providing inputs to the wheat sector as it provides directly to that sector. Gross imports directly required by the wheat sector are negligible, but over 2 cents in gross imports is required by other sectors as a result of the \$1 increase in demand for wheat. Also, there is an indirect requirement placed on almost all of the remaining sectors even though some supply no direct inputs to the wheat sector.

The total impact on each supplying sector is obtained by multiplying any total dollar change in a sector's output (column) by the total-requirements coefficient shown under the heading total output required. The total impact of any dollar change can, therefore, be interpreted in terms of additional output required from any other sector.

Output Multiplier

The output multiplier, which was mentioned briefly above, is the sum of the total output required from all sectors as a result of a \$1-delivery of output to final demand by any one sector. For grain producing industries as a group, the value of the output multiplier ranged from a high of 2.934 for the rye sector to a low of 2.249 for the rice sector. For grain processing industries as a group, it ranged from a high of 3.042 for the rice milling sector to a low of 2.177 for the wet corn milling sector. The absolute value of these data reflects the degree of interdependence of each sector in the U.S. economy and

the relative importance of its output level in stimulating economic activity. For the 65 sectors delineated in this study, values of output multipliers ranged from a high of 3.042 for the rice milling sector to a low of 1.51 for the finance, insurance, real estate, and rental sector.

For any sector, the value of the multiplier is primarily determined by the level of intermediate purchases in relation to the value of total output. Generally, the higher the value of total intermediate purchases per dollar of total output, the higher the value of the multiplier. It can, therefore, be interpreted as a measure of a sector's relative importance in stimulating total economic activity.

IMPLICATIONS OF EXPANDING MARKETS

The previous section discussed the input-output model and explored the industrial interrelations between the U.S. grain system and other relevant sectors of the economy. In terms of value of production and resource (input) requirements, final-market delivery of grain and grain products represents a significant part of our total economic activity.

During the past 10-12 years, grain production and processing have undergone numerous structural and operational changes. These changes have mainly been in response to, as well as a result of, changes in other sectors of the economy.

Rising labor costs have increased the substitution of capital for labor; changes in transportation rate structures have affected the location of processing plants and market areas; and prolonged overcapacity combined with rising input costs has resulted in high per-unit costs in relation to revenues.

Grain producers, grain processors, industry trade representatives, and Government policymakers are becoming increasingly aware of the need to understand the many internal and external forces influencing the structure and operation of the industry. To help meet this need, it is necessary to determine the degree to which the various sectors of the grain system are affected by actions in other sectors and, in turn, what effect changes in the grain sectors have on their suppliers.

This section utilizes the disaggregated input-output model to develop meaningful insights into demand-supply responses related to the domestic grain system. These responses include the effects that increases in certain final-demand markets have on production levels and resource use in the grain sectors. To assess the total effects of changing market demands, the analysis identifies primary and secondary market demands that are important in influencing the operations of grain production and marketing.

Market Size

The projected economic expansion for the United States for the 1970's will affect all sectors of the economy. Population growth, rising incomes, and expanding world markets are the primary factors that will influence economic growth. Certain sectors will be affected more than others. Output levels and even structural relationships will necessarily change.

The implication of these changes for the agricultural complex is obvious. The volume of crop and livestock production will increase in response to growing domestic and foreign demand. Agricultural processing industries and marketing agencies will share in this expansion.

Grain producers and processors will need to make various adjustments in their production levels and resource requirements as a result of changes in output and resource use in grain and other sectors. The degree to which these adjustments will vary depends primarily upon the type of grain produced and the nature of the processing operation.

This study was not designed to project future levels of grain production and processing activity. Instead, the analysis quantitatively establishes relevant input-output relationships and then uses them to measure the effects that changing final markets have on stimulating economic activity throughout the grain system. Both absolute output adjustments and relative responses are examined.

To simulate the effects of expanded final markets, changes were made in the 1967 level of output of four selected sectors. Changes in total output (both intermediate and final uses) were considered for:

(a) livestock and livestock products (sector 5)
(b) bakery products (sector 21).

Changes in exports (one component of total output) were considered for:

(c) wheat (sector 2A)
(d) rice (sector 2C).

The industrial composition of these sectors is described in appendix table 1. The impact of changes in total output and exports was measured by increasing 1967 levels by 20 percent. A 20-percent increase was considered to be a realistic level for purposes of this analysis. A constant percentage increase was used for each of the four sectors to show the relative impacts they have on other sectors. Any market size or percentage change in output could be used. However, changes in output and the resulting output responses in other sectors do assume constant input-output relationships.

Impacts

For total output in sectors 5 and 21, the 20-percent increase was independently applied to the 1967 total output of each of the two sectors. (The 1967 output totals are shown in the transaction table--appendix table 2--as the sums of rows 5 and 21.)

The resulting dollar change in final-market output of each sector was multiplied by each entry in the sector's column of total-requirement coefficients. 6/ This procedure yielded the additional output required in each sector

6/ The complete matrix of total requirements coefficients will not be published. It will be made available, however, by the authors upon request.

of the economy to support the increased delivery of livestock products and bakery products. Additional direct inputs required and indirect outputs generated are included in the resulting data.

Impacts of increased exports of wheat and rice were studied in essentially the same manner. For exports of wheat, only that portion of total output of the wheat sector represented by exports was increased 20 percent. Because rice is exported as milled rice, rough rice must first be processed through rice mills before being exported. Therefore, to accurately measure impacts of rice exports, the 20-percent increase was applied to the value of exports from rice mills (sector 19). Exports of each sector represent nearly 50 percent of its total output; hence, their absolute and relative impact on the grain system is important. 7/

For livestock and livestock products and bakery products, exports were not considered separately. Such exports represent only one component of the total output considered. For these sectors, however, very little of the total output is made up of exports.

The remainder of the report discusses the more significant interindustry impacts of the various changes, with particular emphasis on grain production and processing.

Output Adjustments

Tables 7-10 show the various output adjustments required in the economy in response to a 20-percent increase in final-market deliveries of: (a) livestock and livestock products, (b) bakery products, (c) wheat exports, and (d) rice exports. Associated with the hypothetical 20-percent increase are the direct inputs needed to produce the increase and the indirect output generated as a result of other sectors increasing their production. For many of the sectors, the indirect requirements can represent a significant, though sometimes overlooked, factor affecting their level of output. For grain producers and processors in particular, indirect demand for their output contributes an important portion of their total dollar sales.

Compared with the other final-markets analyzed, increased output of livestock and livestock products results in the largest absolute output adjustment for grain producers and processors (table 7). The increased output of livestock and livestock products requires additional corn inputs of $666 million and further generates $234 million of corn output to meet the needs of other sectors directly or indirectly supplying inputs to the livestock sector. Increases in the output of other grains range from a total of $2 million for rye producers to $150 million for sorghum producers. For grain processors as a group, the impacts are also significant. In particular, producers of prepared animal feeds experience a total output adjustment of $953 million, of which $715 million represents direct inputs and $238 million represents indirect output generated.

7/ U.S. Dept. of Commerce, Bureau of the Census, U.S. Commodity Exports and Imports as Related to Output, 1967 and 1966, Sept. 1970.

Table 7.--Direct, indirect, and total effects of a 20-percent increase in total output of livestock and livestock products on specified sectors

Sector	Additional direct input required	Additional indirect output generated	Total output adjustment
	- - -	Million dollars	- - -
Wheat	11	35	46
Rye	1	1	2
Rice	--	3	3
Corn	666	234	900
Oats	83	35	118
Barley	35	18	53
Sorghum	100	50	150
Livestock & livestock products	7,105	449	7,554
Other agricultural products	758	214	972
Ag. services, forestry, & fisheries	82	88	170
Crude petroleum & natural gas	--	109	109
Maintenance & repair construction	53	135	188
Flour & other grain mill products	18	45	63
Prepared animal feeds	715	238	953
Rice milling	1	3	4
Wet corn milling	4	8	12
Bakery products	--	2	2
Other food & kindred products	9	79	88
Paper & allied products	3	91	94
Chemicals etc.	25	261	286
Petroleum refining & related prod.	34	163	197
Machinery, except electrical	2	67	69
Transportaion & warehousing	165	307	472
Communications & utilities	46	205	251
Wholesale & retail trade	237	322	559
Finance, insurance, real estate & rental	120	533	653
Lodging, personal, & business services	39	283	322
Imports	61	155	216
All other	154	1,023	1,177

Table 8.--Direct, indirect, and total effects of a 20-percent increase in total output of bakery products on specified sectors

Sector	Additional direct input required	Additional indirect output generated	Total output adjustment
	- - -	Million dollars	- - -
Wheat	--	44	44
Rye	--	2	2
Rice	--	2	2
Corn	--	22	22
Oats	--	3	3
Barley	--	1	1
Sorghum	--	4	4
Livestock & livestock products	--	98	98
Other agricultural products	11	23	34
Ag. services, forestry, & fisheries	--	9	9
Crude petroleum & natural gas	--	20	20
Maintenance & repair construction	9	21	30
Flour & other grain mill products	214	9	223
Prepared animal feeds	--	14	14
Rice milling	--	3	3
Wet corn milling	11	4	15
Bakery products	1,550	1	1,551
Other food & kindred products	170	50	220
Paper & allied products	41	53	94
Chemicals etc.	4	27	31
Petroleum refining & related prod.	14	21	35
Machinery, except electrical	--	24	24
Transportation & warehousing	31	83	114
Communications & utilities	25	50	75
Wholesale & retail trade	60	59	119
Finance, insurance, real estate, & rental	28	72	100
Lodging, personal, & business services	78	60	138
Imports	4	34	38
All other	120	229	349

Table 9.--Direct, indirect, and total effects of a 20-percent increase in wheat exports on specified sectors

Sector	Additional direct input required	Additional indirect output generated	Total output adjustment
	- - - -	Million dollars	- - - -
Wheat	232	1	233
Rye	--	1	1
Rice	--	1	1
Corn	--	6	6
Oats	--	1	1
Barley	--	--	--
Sorghum	--	3	3
Livestock & livestock products	38	13	51
Other agricultural products	--	7	7
Ag. services, forestry, & fisheries	11	2	13
Crude petroleum & natural gas	--	8	8
Maintenance & repair construction	6	6	12
Flour & other grain mill products	--	1	1
Prepared animal feeds	--	4	4
Rice milling	--	2	2
Wet corn milling	--	--	--
Bakery products	--	1	1
Other food & kindred products	--	1	1
Paper & allied products	--	5	5
Chemicals etc.	10	7	17
Petroleum refining & related prod.	11	5	16
Machinery, except electrical	3	3	6
Transportation & warehousing	3	8	11
Communications & utilities	4	10	14
Wholesale & retail trade	8	9	17
Finance, insurance, real estate, & rental	43	19	62
Lodging, personal, & business services	10	8	18
Imports	*	4	4
All other	5	32	37

*Less than $500,000.

Table 10.--Direct, indirect, and total effects of a 20-percent increase in rice exports on specified sectors

Sector	Additional direct input required	Additional indirect output generated	Total output adjustment
	- - - -	Million dollars	- - - -
Wheat	--	1	1
Rye	--	1	1
Rice	44	2	46
Corn	--	--	--
Oats	--	--	--
Barley	--	--	--
Sorghum	--	2	2
Livestock & livestock products	--	5	5
Other agricultural products	--	--	--
Ag. services, forestry, & fisheries	--	3	3
Crude petroleum & natural gas	--	3	3
Maintenance & repair construction	*	4	4
Flour & other grain mill products	--	1	1
Prepared animal feeds	--	--	--
Rice milling	--	65	65
Wet corn milling	--	--	--
Bakery products	--	1	1
Other food & kindred products	--	--	--
Paper & allied products	2	2	4
Chemicals etc.	--	3	3
Petroleum refining & related prod.	--	6	6
Machinery, except electrical	--	2	2
Transportation & warehousing	6	3	9
Communications & utilities	1	6	7
Wholesale & retail trade	5	4	9
Finance, insurance, real estate, & rental	*	16	16
Lodging, personal, & business services	*	3	3
Imports	--	1	1
All other	3	13	16

*Less than $500,000.

The flour and other grain mill products sector experiences a significant indirect response. While only about 2.1 percent of its total output is shipped to the livestock sector (table 1), its output increases by $63 million as a result of the 20-percent increase in total output of livestock and livestock products.

Further examination of table 7 reveals other important output adjustments in other sectors of the economy. Of particular note is the magnitude of output adjustments in service sectors--transportation and warehousing, communications and utilities, wholesale and retail trade, and others itemized. These responses reflect the direct demand for services in producing the final product plus the indirect requirements needed to produce the inputs for these services.

Effects of the increase in total output of bakery products are summarized in table 8. While there is no direct output response from the grain production sectors, substantial indirect output is generated in these sectors, primarily in response to the direct demand for processed grain products from the grain milling sectors. As may be expected, operations of the flour and other grain mill products sector are mainly affected. The 20-percent increase in output of bakery goods requires an additional $223 million of output from flour mills. Of this, $214 million or over 95 percent is directly required as inputs. In constrast, both the prepared animal feeds and the rice milling sectors distribute no output to the bakery products industry. However, moderate output increases are indirectly generated in response to increased output of bakery products.

Wheat and rice exports are the last final markets examined. Impacts of increased exports of wheat and rice are shown in tables 9 and 10, respectively. The primary effect is that production of wheat and rice increases directly, which reflects the direct influence that exports of any raw commodity have on production of that product.

Of particular interest is the strong indirect impact which rice exports have on the rice milling sector (table 10). The 20-percent increase in rice exports results in a total output adjustment of $65 million in rice mills, all of which is represented by indirect requirements. This situation arises primarily because most U.S. rice is exported as milled rice, thus requiring processing through the rice milling sector.

Also associated with the 20-percent expansion in wheat and rice exports are modest indirect increases in output of other grain processing sectors. Other economic sectors also experience slight direct and indirect output adjustments.

Again, the output responses discussed in this report should not be interpreted to represent projected output levels or input requirements. The responses were computed primarily to demonstrate the effects that output changes in other sectors have on the grain production and processing system and to provide insights for a clearer understanding of the interconnections between these sectors.

Relative Impacts

For the economic sectors itemized in tables 7-10, table 11 compares, in percentage terms, the total output adjustments resultihg from a 20-percent

Table 11.--Relative increase in total output in specified sectors associated with a 20-percent increase in selected final markets

Sector	Final market			
	Livestock & livestock products	Bakery products	Wheat exports	Rice exports
	- - - - - - Percent - - - - - -			
Wheat	1.8	1.7	9.2	*
Rye	4.7	4.7	2.3	2.3
Rice	0.7	0.4	0.2	10.1
Corn	16.2	0.4	0.1	--
Oats	17.4	0.4	0.1	--
Barley	11.2	0.2	--	--
Sorghum	16.6	0.4	0.3	0.2
Livestock & livestock products	24.6	0.3	0.2	*
Other agricultural products	7.4	0.3	0.1	--
Ag. services, forestry, & fisheries	4.9	0.3	0.4	0.1
Crude petroleum & natural gas	0.7	0.1	0.1	*
Maintenance & repair construction	0.8	0.1	*	*
Flour & other grain mill products	1.5	5.3	*	*
Prepared animal feeds	17.7	0.3	0.1	--
Rice milling	0.7	0.5	0.4	11.6
Wet corn milling	1.4	1.8	--	--
Bakery products	*	20.3	*	*
Other food & kindred products	0.1	0.3	*	--
Paper & allied products	0.4	0.4	*	*
Chemicals etc.	0.8	0.1	*	*
Petroleum refining & related prod.	0.8	0.1	0.1	*
Machinery, except electrical	0.1	*	*	*
Transportation & warehousing	0.9	0.2	*	*
Communications & utilities	0.4	0.1	*	*
Wholesale & retail trade	0.4	0.1	*	*
Finance, insurance, real estate, & rental	0.4	0.1	*	*
Lodging, personal, & business services	0.5	0.2	*	*
Imports	0.8	0.1	*	*
All other	0.2	*	*	*

*Less than 0.05-percent response.

increase in final-market deliveries of livestock and livestock products, bakery products, wheat exports, and rice exports.

By reading down the columns of the table, the reader can see what corresponding percentage change would be required in other sectors as a result of a 20-percent increase in the final-demand market. For example, a 20-percent increase in total output of livestock and livestock products would result in a 1.8-percent increase in wheat production and a 4.7-percent increase in rye production. The largest increases would be experienced by producers of feed grains (corn, oats, barley, and sorghum) and by the prepared animal feeds sector. The reader can also compare increases among sectors. The increase in total output of livestock and livestock products would result in a 16.2-percent increase in corn production, compared with a 17.4-percent increase in oats output. Therefore, expanding livestock output would have a greater relative effect on the oats sector than on the corn sector. However, as data in table 7 show, the value of the total output adjustments for corn producers would be $900 million, in contrast to only $118 million for oats producers. Further comparison of relative impacts shown in table 11 with values shown in tables 7-10 reveals other interesting relationships.

By reading across a row in table 11, the reader can compare the relative effects of each of the four final-market increases in stimulating activity in a particular sector. Wheat production, for example, is more responsive to a 20-percent increase in wheat exports than it is to an equal increase in aggregate consumption of bakery products. This form of comparison is useful in assessing the probable impact of industry production forecasts on levels of output and resource use in other sectors.

General Implications

Although the relative impacts presented in table 11 are based on a 20-percent increase in selected final markets, they may be used to estimate responses to any level of change in the four markets. Other market increases (or decreases) would exhibit linear relationships to the responses shown in table 11. For example, the table shows that wheat output would increase 1.7 percent when aggregate consumption of bakery products goes up 20 percent. Therefore, if bakery products were to increase only 10 percent, wheat output would grow about 0.8 percent in response.

This assumption of linearity, while somewhat restrictive, is basic to an input-output system. It rules out economies of scale and does not consider present levels of capacity utilization. Despite this restriction, however, the analysis provides broad implications for industry output and resource use.

The output responses detailed in tables 7-10 can be used to estimate approximate effects of changes in output on resource requirements. Data on man-hours required per dollar of gross output can be applied to the appropriate total output adjustments to estimate the resulting change in labor requirements. Similar analysis is possible for any limited resource (fuel, water, or gas, for ample) or for total factor inputs (value-added categories). However, each vestigation would require additional simplifying assumptions, and probably justments, based on knowledge of the particular industries of interest.

Expanding markets for grain and grain food products will lead to a number of changes in firms engaged in grain production, processing, and marketing. The additional demand for these firms' output and services may require adjustments in both facilities and practices. Industries supplying inputs will also be affected.

A more complete evaluation of the effects of expanding markets is possible with knowledge of output levels attainable under present capacity utilizations and resource availabilities. For a particular sector of interest, present production capabilities can be compared with output adjustments indicated through the input-output framework. Comparisons of this nature yield insights into possible adjustments in number of producing units, capacities, demand for resources, and factor inputs. These types of analyses, while providing fruitful areas for investigation, are beyond the scope of this study.

Appendix table 1.--Economic sectors of a 1967 transaction table, related to SIC industry codes

Industry number & title	SIC industry codes (1967 edition)
1. Cotton	0112
2a. Wheat	pt. 0113
2b. Rye	pt. 0113
2c. Rice	pt. 0113
3a. Corn	pt. 0113
3b. Oats	pt. 0113
3c. Barley	pt. 0113
3d. Sorghum	pt. 0113
4. Oil bearing crops	pt. 0113, pt. 0119
5. Livestock & livestock products	013, pt. 014, 0193, pt. 02, pt. 0729
6. Other agricultural products	011 (excluding 0112, pt. 0113, pt. 0119), 012, pt. 014, 0192, 0199, pt. 02
7. Ag. services, forestry, and fisheries	071, 0723, pt. 0729, 074, 081, 082, 084, 085, 086, 091, 098
8. Iron & ferroalloy ores	1011, 106
9. Nonferrous metal ores	102-105, 108, 109
10. Coal mining	11, 12
11. Crude petroleum & natural gas	1311, 1321
12. Stone & clay mining	141, 142, 144, 145, 148, 149
13. Chemicals & fertilizer minerals	147
14. New construction	138, pt. 15, pt. 16, pt. 17, pt. 6561
15. Maintenance & repair construction	pt. 15, pt. 16, pt. 17
16. Ordnance & accessories	19
17. Flour & other grain mill products	2041, 2043, 2045
18. Prepared animal feeds	2042
19. Rice milling	2044
20. Wet corn milling	2046
21. Bakery products	205
22. Misc. food & kindred products	209
23. Other food & kindred products	201, 202, 203, 206, 207, 208
24. Tobacco manufactures	21
25. Broad & narrow fabrics and yarn & thread mills	221-224, 226, 228
26. Misc. textile goods and floor coverings	227, 229
27. Apparel	225, 23 (excluding 239), 3992
28. Misc. fabricated textile prod.	239
29. Lumber and wood products	24
30. Furniture and fixtures	25

31. Paper and allied products	26
32. Printing and publishing	27
33. Chemicals etc.	281 (excluding alumina pt. of 2819), 286, 287, 289, 283-285
34. Plastics and synthetics	282
35. Petroleum refining & related prod.	29
36. Rubber & misc. plastic products	30
37. Leather tanning, etc.	31
38. Glass, stone, & clay products	32
39. Primary iron & steel mfg. & nonferrous mfg.	33, 2819 (alumina only)
40. Fabricated metal products	34
41. Machinery, except electrical	35
42. Electrical equipment	36
43. Transportation equipment	37
44. Scientific instruments	38
45. Miscellaneous manufacturing	39 (excluding 3992)
46. Transportation & warehousing	40, 41, 42, 44, 45, 46, 47
47. Communications & utilities	48, 49
48. Wholesale & retail trade	59 (excluding manufacturers sales offices), 52-59, pt. 7399
49. Finance, ins., real estate, & rental	60-67 (excluding 6541 & pt. 6561)
50. Lodging, pers., & business services	70, 72, 76, 6541, 73 (excluding 7361, 7391, & pt. 7399), 81, 89 (excluding 8921)
51. Research & development	--
52. Auto repair	75
53. Amusements,and med. & educ. services	78, 79, 0722, 7361, 80, 82, 84, 86, 8921
54. Federal Govt. enterprises	--
55. State & local Govt. enterprises	--
56. Gross imports	--
57. Misc. industries	--
58. Government (general)	--
59. Rest of world	--
60. Household industry	--

Source: Executive Office of the President, U.S. Bureau of the Budget, Standard Industrial Classification Manual, 1967 edition.

Appendix table 2.--Interindustry transactions, 1967 1/

(In millions of dollars at producers' prices)

Industry number & title	1	2a	2b	2c	3a
1. Cotton	6	--	--	--	--
2a. Wheat	--	100	--	--	--
2b. Rye	--	--	6	--	--
2c. Rice	--	--	--	16	--
3a. Corn	--	--	--	--	14
3b. Oats	--	--	--	--	--
3c. Barley	--	--	--	--	--
3d. Sorghum	--	--	--	--	--
4. Oil bearing crops	--	--	--	--	--
5. Livestock & livestock products	118	406	14	13	486
6. Other agricultural products	--	--	--	--	--
7. Ag. services, forestry & fisheries	230	118	1	25	167
8. Iron & ferroalloy ores	--	--	--	--	--
9. Nonferrous metal ores	--	--	--	--	--
10. Coal mining	--	--	--	--	--
11. Crude petroleum & natural gas	--	--	--	--	--
12. Stone & clay mining	6	7	*	1	36
13. Chemicals & fertilizer minerals	2	2	--	--	13
14. New construction	--	--	--	--	--
15. Maintenance & repair construction	34	58	1	12	148
16. Ordnance & accessories	--	--	--	--	--
17. Flour & other grain mill products	--	--	--	--	--
18. Prepared animal feeds	--	--	--	--	--
19. Rice milling	--	--	--	--	--
20. Wet corn milling	--	--	--	--	--
21. Bakery products	--	--	--	--	--
22. Misc. food and kindred products	--	--	--	--	--
23. Other food and kindred products	--	--	--	--	--
24. Tobacco manufactures	--	--	--	--	--
25. Broad, narrow fabrics, yarn thread mills	--	--	--	--	--
26. Misc. textile goods and floor coverings	--	--	--	--	--
27. Apparel	--	--	--	--	--
28. Misc. fabricated textile prod.	1	--	--	1	3
29. Lumber and wood products	--	--	--	--	1
30. Furniture and fixtures	--	--	--	--	--

31. Paper and allied products	--	--	--	--	--
32. Printing and publishing	1	1	*	*	3
33. Chemicals, etc.	123	115	1	24	353
34. Plastics and synthetics	--	--	--	--	--
35. Petroleum refining and related prod.	46	104	1	22	305
36. Rubber and misc. plastic products	10	21	*	4	58
37. Leather tanning, etc.	1	--	--	--	1
38. Glass, stone & clay products	2	3	*	*	11
39. Primary iron & steel mfg, & nonferrous mfg.	--	--	--	--	--
40. Fabricated metal products	3	4	*	1	22
41. Machinery, except electrical	12	28	*	6	81
42. Electrical equipment	2	3	*	1	8
43. Transportation equipment	2	4	*	1	10
44. Scientific instruments	--	--	--	--	--
45. Miscellaneous manufacturing	--	--	--	--	--
46. Transportation & warehousing	27	32	1	7	108
47. Communications & utilities	36	33	1	7	98
48. Wholesale & retail trade	66	90	2	20	309
49. Finance, ins. real estate & rental	348	493	6	108	981
50. Lodging, pers. & business services	64	136	2	30	355
51. Research & development	--	--	--	--	--
52. Auto repair	5	9	*	2	23
53. Amusements, med. & educ. services	1	1	--	--	4
54. Federal Govt. enterprises	--	--	--	--	1
55. State & local Govt. enterprises	--	--	--	--	--
56. Gross imports	18	1	2	--	2
57. Misc. industries	3	3	*	1	10
58. Government (general)	--	--	--	--	--
59. Rest of world	--	--	--	--	--
60. Household industry	--	--	--	--	--
Intermediate inputs, total	1,167	1,772	38	302	3,611
Value added	304	763	5	152	1,945
Total	1,471	2,535	43	454	5,556

* Less than $500,000.

1/ A row represents the industry's distribution of goods and services to the industries designated in the head of the columns. Hence, a column shows an industry's purchases from other industries.

continued--

Appendix table 2.--Interindustry transactions, 1967 1/--continued

(In millions of dollars at producers' prices)

Industry number and title	3b	3c	3d	4	5	6
1. Cotton	--	--	--	--	--	--
2a. Wheat	--	--	--	--	54	--
2b. Rye	--	--	--	--	3	--
2c. Rice	--	--	--	--	--	--
3a. Corn	--	--	--	--	3,335	--
3b. Oats	33	--	--	--	415	--
3c. Barley	--	16	--	--	177	--
3d. Sorghum	--	--	2	--	494	--
4. Oil bearing crops	--	--	--	141	3	--
5. Livestock & livestock products	135	71	125	313	4,852	377
6. Other agricultural products	--	--	--	--	3,794	196
7. Ag. services, forestry & fisheries	17	12	25	98	407	270
8. Iron & ferroalloy ores	--	--	--	--	--	--
9. Nonferrous metal ores	--	--	--	--	--	--
10. Coal mining	--	--	--	--	7	1
11. Crude petroleum & natural gas	--	--	--	--	--	--
12. Stone & clay mining	4	3	5	4	1	19
13. Chemicals & fertilizer minerals	1	1	2	1	--	6
14. New construction	--	--	--	--	--	--
15. Maintenance & repair construction	15	11	22	37	265	147
16. Ordnance & accessories	--	--	--	--	--	--
17. Flour & other grain mill products	--	--	--	--	91	--
18. Prepared animal feeds	--	--	--	--	3,581	--
19. Rice milling	--	--	--	--	4	--
20. Wet corn milling	--	--	--	--	20	--
21. Bakery products	--	--	--	--	--	--
22. Misc. food and kindred products	--	--	--	--	279	3
23. Other food and kindred products	--	--	--	--	45	--
24. Tobacco manufactures	--	--	--	--	--	--
25. Broad, narrow fabrics, yarn thread mills	--	--	--	--	--	8
26. Misc. textile goods and floor coverings	--	--	--	--	9	30
27. Apparel	--	--	--	--	--	--
28. Misc. fabricated textile prod.	*	*	1	--	17	38
29. Lumber and wood products	*	*	*	--	3	130
30. Furniture and fixtures	--	--	--	--	--	--

31. Paper and allied products	--	--	--	--	17	5
32. Printing and publishing	*	*	*	--	5	3
33. Chemicals, etc.	37	26	53	38	126	511
34. Plastics and synthetics	--	--	--	--	--	--
35. Petroleum refining and related prod.	32	23	46	127	166	223
36. Rubber and misc. plastic products	6	4	9	24	48	55
37. Leather tanning, etc.	*	*	*	--	4	--
38. Glass, stone & clay products	1	*	2	2	5	11
39. Primary iron & steel mfg. & nonferrous mfg.	--	--	--	--	1	1
40. Fabricated metal products	2	2	3	5	76	20
41. Machinery, except electrical	9	6	12	34	9	90
42. Electrical equipment	1	*	1	4	8	12
43. Transportation equipment	1	1	1	4	18	23
44. Scientific instruments	--	--	--	--	--	--
45. Miscellaneous manufacturing	--	--	--	--	--	1
46. Transportation & warehousing	11	8	17	23	827	186
47. Communications & utilities	10	7	15	19	228	217
48. Wholesale & retail trade	32	23	47	93	1,185	466
49. Finance, ins. real estate & rental	102	73	149	275	601	618
50. Lodging, pers. & business services	37	26	54	157	196	320
51. Research & development	--	--	--	--	--	--
52. Auto repair	2	2	3	6	55	64
53. Amusements, med. & educ. services	*	*	1	2	205	6
54. Federal Govt. enterprises	*	*	*	--	4	3
55. State & local Govt. enterprises	--	--	--	--	--	1
56. Gross imports	3	10	1	1	307	720
57. Misc. industries	1	*	2	2	22	17
58. Government (general)	--	--	--	--	--	--
59. Rest of world	--	--	--	--	--	--
60. Household industry	--	--	--	--	--	--
Intermediate inputs, total	492	325	598	1,410	21,969	4,798
Value added	187	147	304	1,545	8,691	8,283
Total	679	472	902	2,955	30,660	13,081

* Less than $500,000.

1/ A row represents the industry's distribution of goods and services to the industries designated in the head of the columns. Hence, a column shows an industry's purchases from other industries.

continued--

Appendix table 2.--Interindustry transactions, 1967 1/--continued

(In millions of dollars at producers' prices)

Industry number & title	7	8	9	10	11	12
1. Cotton	62	--	--	--	--	--
2a. Wheat	190	--	--	--	--	--
2b. Rye	4	--	--	--	--	--
2c. Rice	16	--	--	--	--	--
3a. Corn	44	--	--	--	--	--
3b. Oats	40	--	--	--	--	--
3c. Barley	26	--	--	--	--	--
3d. Sorghum	33	--	--	--	--	--
4. Oil bearing crops	91	--	--	--	--	--
5. Livestock & livestock products	386	--	--	--	--	--
6. Other agricultural products	225	--	--	--	--	--
7. Ag. services, forestry & fisheries	41	--	--	--	--	--
8. Iron & ferroalloy ores	--	91	19	--	--	--
9. Nonferrous metal ores	--	54	315	--	--	3
10. Coal mining	--	5	1	387	--	8
11. Crude petroleum & natural gas	--	--	--	--	316	--
12. Stone & clay mining	--	--	--	1	--	40
13. Chemicals & fertilizer minerals	--	--	1	--	--	3
14. New construction	--	--	--	--	--	--
15. Maintenance & repair construction	2	1	1	2	6	6
16. Ordnance & accessories	--	--	--	--	--	--
17. Flour & other grain mill products	--	--	--	--	--	--
18. Prepared animal feeds	16	--	--	--	--	--
19. Rice milling	--	--	--	--	--	--
20. Wet corn milling	--	--	--	--	--	--
21. Bakery products	--	--	--	--	--	--
22. Misc. food and kindred products	23	--	--	--	--	--
23. Other food and kindred products	--	--	--	--	--	--
24. Tobacco manufactures	--	--	--	--	--	--
25. Broad, narrow fabrics, yarn thread mills	--	--	3	2	--	--
26. Misc. textile goods and floor coverings	28	--	--	--	3	--
27. Apparel	--	--	--	--	--	--
28. Misc. fabricated textile prod.	--	--	--	--	--	--
29. Lumber and wood products	--	8	1	19	8	--
30. Furniture and fixtures	--	--	--	--	--	--

31. Paper and allied products	29	--	1	7	8	53
32. Printing and publishing	--	--	--	1	1	3
33. Chemicals, etc.	2	17	55	44	75	56
34. Plastics and synthetics	--	--	--	--	--	--
35. Petroleum refining and related prod.	24	12	10	28	69	133
36. Rubber and misc. plastic products	14	1	6	25	47	100
37. Leather tanning, etc.	--	--	--	--	--	--
38. Glass, stone & clay products	--	1	8	6	6	319
39. Primary iron & steel mfg. & nonferrous mfg.	--	30	75	39	14	74
40. Fabricated metal products	12	3	3	31	87	3
41. Machinery, except electrial	--	36	50	144	229	375
42. Electrical equipment	--	3	9	11	69	10
43. Transportation equipment	20	3	1	16	11	16
44. Scientific instruments	--	--	--	--	2	--
45. Miscellaneous manufacturing	4	--	--	4	--	3
46. Transportation & warehousing	48	182	75	26	476	100
47. Communications & utilities	18	35	60	94	157	186
48. Wholesale & retail trade	31	28	46	90	184	185
49. Finance, ins. real estate & rental	126	135	88	106	2,524	223
50. Lodging, pers. & business services	166	12	16	20	640	67
51. Research & development	--	--	--	--	--	--
52. Auto repair	--	--	--	1	24	--
53. Amusements, med. & educ. services	3	1	1	3	14	3
54. Federal Govt. enterprises	2	1	1	3	--	3
55. State & local Govt. enterprises	--	--	--	1	6	3
56. Gross imports	--	729	426	2	1,569	437
57. Misc. industries	2	7	8	17	253	38
58. Government (general)	--	--	--	--	--	--
59. Rest of world	--	--	--	--	--	--
60. Household industry	--	--	--	--	--	--
Intermediate inputs, total	1,728	1,395	1,280	1,130	6,798	2,450
Value added	1,772	213	714	1,538	8,170	2,817
Total	3,500	1,608	1,994	2,668	14,968	5,267

1/ A row represents the industry's distribution of goods and services to the industries designated in the head of the columns. Hence, a column shows an industry's purchases from other industries.

continued--

Appendix table 2.--Interindustry transactions, 1967 1/--continued

(In millions of dollars at producers' prices)

Industry number & title	13	14	15	16	17	18
1. Cotton	--	--	--	--	--	--
2a. Wheat	--	--	--	--	758	43
2b. Rye	--	--	--	--	11	--
2c. Rice	--	--	--	--	--	--
3a. Corn	--	--	--	--	107	387
3b. Oats	--		--	--	32	39
3c. Barley	--	--	--	--	4	32
3d. Sorghum	--	--	--	--	6	138
4. Oil bearing crops	--	--	--	--	--	--
5. Livestock & livestock products	--	--	--	--	--	--
6. Other agricultural products	--	259	--	--	--	11
7. Ag. services, forestry & fisheries	--	--	--	--	--	--
8. Iron & ferroalloy ores	--	--	--	--	--	--
9. Nonferrous metal ores	--	--	--	--	--	--
10. Coal mining	--	--	--	--	2	--
11. Crude petroleum & natural gas	2	--	--	--	--	--
12. Stone & clay mining	19	790	166	--	--	5
13. Chemicals & fertilizer minerals	57	--	--	--	--	5
14. New construction	--	--	--	--	--	--
15. Maintenance & repair construction	--	8	1	16	11	17
16. Ordnance & accessories	--	2	--	71	--	--
17. Flour & other grain mill products	--	--	--	--	58	200
18. Prepared animal feeds	--	--	--	--	55	394
19. Rice milling	--	--	--	--	26	4
20. Wet corn milling	--	--	--	--	5	29
21. Bakery products	--	--	--	--	2	--
22. Misc. food and kindred products	--	22	--	--	131	1,008
23. Other food and kindred products	--	--	--	--	200	229
24. Tobacco manufactures	--	--	--	--	--	--
25. Broad, narrow fabrics, yarn thread mills	--	--	--	--	--	--
26. Misc. textile goods and floor coverings	--	5	1	--	--	--
27. Apparel	--	--	1	--	--	--
28. Misc. fabricated textile prod.	--	--	--	7	47	72
29. Lumber and wood products	--	3,940	502	10	3	4
30. Furniture and fixtures	--	591	19	--	--	--

31. Paper and allied products	8	384	81	46	160	74
32. Printing and publishing	--	9	1	16	2	3
33. Chemicals, etc.	36	664	1,119	30	2	177
34. Plastics and synthetics	--	--	--	--	--	--
35. Petroleum refining and related prod.	10	1,116	424	19	2	3
36. Rubber and misc. plastic products	7	408	87	247	--	--
37. Leather tanning, etc.	--	--	--	--	--	--
38. Glass, stone & clay products	--	5,032	760	34	--	--
39. Primary iron & steel mfg. & nonferrous mfg.	24	3,663	657	567	--	--
40. Fabricated metal products	--	7,400	1,148	177	9	116
41. Machinery, except electrical	44	1,226	95	1,123	--	--
42. Electrical equipment	7	1,897	371	690	1	1
43. Transportation equipment	2	5	--	1,732	--	--
44. Scientific instruments	--	262	22	247	--	--
45. Miscellaneous manufacturing	--	104	59	25	3	2
46. Transportation & warehousing	89	2,640	435	122	535	441
47. Communications & utilities	71	435	72	110	37	62
48. Wholesale & retail trade	29	5,663	1,574	263	233	244
49. Finance, ins. real estate & rental	24	928	121	123	41	53
50. Lodging, pers. & business services	11	4,088	96	147	203	95
51. Research & development	--	--	--	--	--	--
52. Auto repair	--	392	33	--	18	25
53. Amusements, med. & educ. services	--	77	13	11	3	6
54. Federal Govt. enterprises	--	--	--	7	1	3
55. State & local Govt. enterprises	--	15	2	2	1	1
56. Gross imports	158	--	--	48	12	21
57. Misc. industries	12	375	63	197	18	24
58. Government (general)	--	--	--	--	--	--
59. Rest of world	--	--	--	--	--	--
60. Household industry	--	--	--	--	--	--
Intermediate inputs, total	610	42,400	7,923	6,087	2,739	3,968
Value added	503	32,654	16,240	3,510	1,495	1,402
Total	1,113	75,054	24,163	9,597	4,234	5,370

1/ A row represents the industry's distribution of goods and services to the industries designated in the head of the columns. Hence, a column shows an industry's purchases from other industries.

continued--

Appendix table 2.--Interindustry transactions, 1967 1/--continued

(In millions of dollars at producers' prices)

Industry number & title	19	20	21	22	23	24
1. Cotton	--	--	--	208	--	--
2a. Wheat	--	--	--	--	2	--
2b. Rye	--	--	--	--	5	--
2c. Rice	389	--	--	--	--	--
3a. Corn	--	235	--	--	58	--
3b. Oats	--	--	--	--	--	--
3c. Barley	--	--	--	--	105	--
3d. Sorghum	--	--	--	--	2	--
4. Oil bearing crops	--	--	4	1,561	166	--
5. Livestock & livestock products	--	--	--	63	20,196	--
6. Other agricultural products	--	5	53	159	2,658	1,114
7. Ag. services, forestry & fisheries	--	--	--	30	363	--
8. Iron & ferroalloy ores	--	--	--	--	--	--
9. Nonferrous metal ores	--	--	--	--	--	--
10. Coal mining	--	5	1	6	33	1
11. Crude petroleum & natural gas	--	--	--	--	--	--
12. Stone & clay mining	--	--	--	2	--	--
13. Chemicals & fertilizer minerals	--	--	--	--	3	--
14. New construction	--	--	--	--	--	--
15. Maintenance & repair construction	1	4	42	33	221	--
16. Ordnance & accessories	--	--	--	--	--	--
17. Flour & other grain mill products	--	8	1,068	69	199	--
18. Prepared animal feeds	--	1	--	9	34	--
19. Rice milling	--	--	--	--	30	--
20. Wet corn milling	--	27	63	47	290	--
21. Bakery products	--	--	121	--	--	--
22. Misc. food and kindred products	--	13	232	1,090	218	7
23. Other food and kindred products	--	10	853	245	8,830	35
24. Tobacco manufactures	--	--	--	--	1	1,303
25. Broad, narrow fabrics, yarn thread mills	--	--	--	--	11	1
26. Misc. textile goods and floor coverings	--	--	--	--	1	--
27. Apparel	--	--	4	12	39	--
28. Misc. fabricated textile prod.	23	--	--	5	19	--
29. Lumber and wood products	1	1	5	47	88	11
30. Furniture and fixtures	--	--	--	--	--	--

31. Paper and allied products	9	4	200	196	1,135	156
32. Printing and publishing	1	1	28	35	88	13
33. Chemicals, etc.	--	8	22	153	275	14
34. Plastics and synthetics	--	--	--	3	18	12
35. Petroleum refining and related prod.	--	1	65	264	66	3
36. Rubber and misc. plastic products	--	--	55	96	76	12
37. Leather tanning, etc.	--	--	--	--	--	--
38. Glass, stone & clay products	--	--	--	49	826	--
39. Primary iron & steel mfg. & nonferrous mfg.	--	--	22	6	21	8
40. Fabricated metal products	--	--	82	329	2,039	19
41. Machinery, except electrical	--	--	--	5	23	--
42. Electrical equipment	--	--	7	13	30	1
43. Transportation equipment	--	--	--	--	--	--
44. Scientific instruments	--	--	--	--	--	--
45. Miscellaneous manufacturing	--	--	5	5	29	8
46. Transportation & warehousing	49	57	153	606	2,584	98
47. Communications & utilities	3	12	118	164	644	13
48. Wholesale & retail trade	41	40	299	645	1,810	85
49. Finance, ins. real estate & rental	4	10	138	107	732	27
50. Lodging, pers. & business services	8	8	398	304	2,101	402
51. Research & development	--	--	1	--	6	--
52. Auto repair	3	4	64	49	334	3
53. Amusements, med. & educ. services	--	1	13	10	70	8
54. Federal Govt. enterprises	--	--	4	4	25	13
55. State & local Govt. enterprises	--	2	5	5	28	--
56. Gross imports	--	21	19	195	2,458	7
57. Misc. industries	2	6	67	60	357	12
58. Government (general)	--	--	--	--	--	--
59. Rest of world	--	--	--	--	--	--
60. Household industry	--	--	--	--	--	--
Intermediate inputs, total	534	484	4,211	6,889	49,347	3,386
Value added	28	354	3,416	3,940	19,042	3,700
Total	562	838	7,627	10,829	68,389	7,086

1/ A row represents the industry's distribution of goods and services to the industries designated in the head of the columns. Hence, a column shows an industry's purchases from other industries.

continued--

Appendix table 2.--Interindustry transactions, 1967 1/--continued

(In millions of dollars at producers' prices)

Industry number & title	25	26	27	28	29	30
1. Cotton	1,147	20	13	--	--	--
2a. Wheat	--	--	--	--	--	--
2b. Rye	--	--	--	--	--	--
2c. Rice	--	--	--	--	--	--
3a. Corn	--	--	--	--	--	--
3b. Oats	--	--	--	--	--	--
3c. Barley	--	--	--	--	--	--
3d. Sorghum	--	--	--	--	--	--
4. Oil bearing crops	--	--	--	--	--	--
5. Livestock & livestock products	45	106	--	--	--	--
6. Other agricultural products	127	--	--	--	260	--
7. Ag. services, forestry & fisheries	--	--	298	2	923	--
8. Iron & ferroalloy ores	--	--	--	--	--	--
9. Nonferrous metal ores	--	--	--	--	--	--
10. Coal mining	24	3	2	--	2	3
11. Crude petroleum & natural gas	--	--	--	--	--	--
12. Stone & clay mining	--	--	--	--	--	--
13. Chemicals & fertilizer minerals	2	--	--	--	--	--
14. New construction	--	--	--	--	--	--
15. Maintenance & repair construction	12	--	17	--	21	3
16. Ordnance & accessories	--	--	--	--	--	--
17. Flour & other grain mill products	--	--	--	--	--	--
18. Prepared animal feeds	--	--	--	--	--	--
19. Rice milling	--	--	--	--	--	--
20. Wet corn milling	44	--	--	--	--	--
21. Bakery products	--	--	--	--	--	--
22. Misc. food and kindred products	2	31	--	--	--	46
23. Other food and kindred products	--	--	--	--	--	--
24. Tobacco manufactures	--	--	--	--	--	--
25. Broad, narrow fabrics, yarn thread mills	6,348	814	7,939	1,731	--	298
26. Misc. textile goods and floor coverings	451	434	169	302	3	115
27. Apparel	30	14	5,188	36	15	5
28. Misc. fabricated textile prod.	69	28	427	286	2	9
29. Lumber and wood products	2	--	--	--	3,579	821
30. Furniture and fixtures	--	12	--	23	36	136

31. Paper and allied products	183	84	216	91	134	173
32. Printing and publishing	13	2	27	5	42	4
33. Chemicals, etc.	344	18	90	4	148	149
34. Plastics and synthetics	1,803	895	337	--	85	5
35. Petroleum refining and related prod.	44	8	12	3	105	16
36. Rubber and misc. plastic products	85	79	54	132	83	264
37. Leather tanning, etc.	4	2	106	11	1	12
38. Glass, stone & clay products	46	8	--	--	61	190
39. Primary iron & steel mfg. & nonferrous mfg.	12	4	2	2	39	431
40. Fabricated metal products	20	6	37	11	132	516
41. Machinery, except electrical	138	5	--	2	53	77
42. Electrical equipment	8	--	--	--	18	25
43. Transportation equipment	--	4	--	2	10	10
44. Scientific instruments	--	--	5	14	--	17
45. Miscellaneous manufacturing	32	41	569	71	19	64
46. Transportation & warehousing	592	192	313	46	761	198
47. Communications & utilities	344	64	265	33	160	116
48. Wholesale & retail trade	664	247	1,041	182	518	411
49. Finance, ins. real estate & rental	248	92	660	74	194	162
50. Lodging, pers. & business services	283	58	491	43	122	173
51. Research & development	4	--	--	--	--	--
52. Auto repair	13	3	8	7	120	18
53. Amusements, med. & educ. services	22	5	41	4	14	11
54. Federal Govt. enterprises	12	5	48	5	4	4
55. State & local Govt. enterprises	4	2	2	2	7	2
56. Gross imports	605	583	864	45	929	78
57. Misc. industries	87	87	227	33	98	77
58. Government (general)	--	--	--	--	--	--
59. Rest of world	--	--	--	--	--	--
60. Household industry.	--	--	--	--	--	--
Intermediate inputs, total	13,913	3,956	19,468	3,202	8,698	4,639
Value added	4,970	1,020	11,284	1,377	3,599	3,583
Total	18,883	4,976	30,752	4,579	12,297	8,222

1/ A row represents the industry's distribution of goods and services to the industries designated in the head of the columns. Hence, a column shows an industry's purchases from other industries.

continued--

Appendix table 2.--Interindustry transactions, 1967 1/--continued

(In millions of dollars at producers' prices)

Industry number & title	31	32	33	34	35	36
1. Cotton	--	--	--	--	--	--
2a. Wheat	--	--	10	--	--	--
2b. Rye	--	--	--	--	--	--
2c. Rice	--	--	--	--	--	--
3a. Corn	--	--	2	--	--	--
3b. Oats	--	--	--	--	--	--
3c. Barley	--	--	--	--	--	--
3d. Sorghum	--	--	1	--	--	--
4. Oil bearing crops	--	--	--	--	--	--
5. Livestock & livestock products	--	--	4	--	--	--
6. Other agricultural products	--	--	28	--	--	--
7. Ag. services, forestry & fisheries	--	--	30	--	--	--
8. Iron & ferroalloy ores	--	--	122	--	5	--
9. Nonferrous metal ores	--	--	116	--	--	--
10. Coal mining	102	--	110	42	12	18
11. Crude petroleum & natural gas	--	--	46	--	12,630	--
12. Stone & clay mining	62	--	51	--	92	14
13. Chemicals & fertilizer minerals	23	--	608	--	1	15
14. New construction	--	--	--	--	--	--
15. Maintenance & repair construction	91	74	18	57	36	15
16. Ordnance & accessories	1	4	--	--	--	--
17. Flour & other grain mill products	--	--	1	--	--	--
18. Prepared animal feeds	--	--	10	--	--	--
19. Rice milling	--	--	--	--	--	--
20. Wet corn milling	112	--	58	5	--	2
21. Bakery products	--	--	--	--	--	--
22. Misc. food and kindred products	20	--	579	33	16	--
23. Other food and kindred products	2	--	158	--	--	--
24. Tobacco manufactures	--	--	--	--	--	--
25. Broad, narrow fabrics, yarn thread mills	92	2	4	8	--	305
26. Misc. textile goods and floor coverings	27	31	4	2	--	1,017
27. Apparel	17	--	16	4	4	39
28. Misc. fabricated textile prod.	45	--	73	--	2	7
29. Lumber and wood products	1,121	2	88	4	3	24
30. Furniture and fixtures	3	8	--	--	--	4

31. Paper and allied products	6,416	3,780	975	479	131	172
32. Printing and publishing	190	2,448	112	8	1	42
33. Chemicals, etc.	614	313	7,670	3,341	828	716
34. Plastics and synthetics	186	--	1,065	276	24	2,346
35. Petroleum refining and related prod.	230	18	1,418	118	1,707	36
36. Rubber and misc. plastic products	318	28	340	182	11	501
37. Leather tanning, etc.	3	2	--	--	--	29
38. Glass, stone & clay products	94	--	444	7	54	152
39. Primary iron & steel mfg. & nonferrous mfg.	29	25	808	4	4	59
40. Fabricated metal products	253	41	856	33	460	229
41. Machinery, except electrical	125	83	366	38	7	36
42. Electrical equipment	34	22	37	14	11	52
43. Transportation equipment	--	28	2	--	--	36
44. Scientific instruments	12	101	79	28	2	28
45. Miscellaneous manufacturing	20	58	50	7	11	71
46. Transportation & warehousing	1,036	390	1,458	355	1,608	402
47. Communications & utilities	576	517	1,141	163	586	287
48. Wholesale & retail trade	849	489	1,176	180	256	502
49. Finance, ins. real estate & rental	327	1,193	926	147	441	295
50. Lodging, pers. & business services	372	1,317	2,225	169	684	509
51. Research & development	4	--	54	29	11	--
52. Auto repair	23	27	58	5	34	5
53. Amusements, med. & educ. services	26	28	43	10	26	17
54. Federal Govt. enterprises	20	131	79	38	40	12
55. State & local Govt. enterprises	21	3	14	2	10	4
56. Gross imports	1,556	103	730	153	1,206	245
57. Misc. industries	434	554	579	22	57	149
58. Government (general)	--	--	--	--	--	--
59. Rest of world	--	--	--	--	--	--
60. Household industry	--	--	--	--	--	--
Intermediate inputs, total	15,486	11,820	24,842	5,963	21,011	8,452
Value added	7,515	9,482	13,206	2,600	4,161	5,435
Total	23,001	21,302	38,048	8,563	25,172	13,887

1/ A row represents the industry's distribution of goods and services to the industries designated in the head of the columns. Hence, a column shows an industry's purchases from other industries.

continued--

Appendix table 2.--Interindustry transactions, 1967 1/--continued

(In millions of dollars at producers' prices)

Industry number & title	37	38	39	40	41	42
1. Cotton	--	5	--	--	--	--
2a. Wheat	--	--	--	--	--	--
2b. Rye	--	--	--	--	--	--
2c. Rice	--	--	--	--	--	--
3a. Corn	--	--	--	--	--	--
3b. Oats	--	--	--	--	--	--
3c. Barley	--	--	--	--	--	--
3d. Sorghum	--	--	--	--	--	--
4. Oil bearing crops	--	--	--	--	--	--
5. Livestock & livestock products	58	--	--	--	--	--
6. Other agricultural products	--	--	--	--	--	--
7. Ag. services, forestry & fisheries	1	--	--	--	6	--
8. Iron & ferroalloy ores	--	16	1,329	--	2	12
9. Nonferrous metal ores	--	7	1,365	4	--	12
10. Coal mining	2	89	708	7	13	10
11. Crude petroleum & natural gas	--	--	--	--	--	--
12. Stone & clay mining	--	895	103	4	19	--
13. Chemicals & fertilizer minerals	1	33	14	--	--	--
14. New construction	--	--	--	--	--	--
15. Maintenance & repair construction	--	6	217	24	59	44
16. Ordnance & accessories	--	--	2	4	12	174
17. Flour & other grain mill products	--	4	--	--	--	--
18. Prepared animal feeds	--	1	--	--	--	--
19. Rice milling	--	--	--	--	--	--
20. Wet corn milling	3	--	14	--	--	--
21. Bakery products	--	--	--	--	--	--
22. Misc. food and kindred products	--	5	--	--	2	--
23. Other food and kindred products	268	--	--	--	--	--
24. Tobacco manufactures	--	--	--	--	--	--
25. Broad, narrow fabrics, yarn thread mills	93	22	24	11	13	26
26. Misc. textile goods and floor coverings	50	3	10	12	--	5
27. Apparel	21	5	33	31	45	44
28. Misc. fabricated textile prod.	1	5	8	6	--	--
29. Lumber and wood products	37	113	55	184	119	110
30. Furniture and fixtures	1	8	4	64	23	361

31. Paper and allied products	84	664	161	330	189	612
32. Printing and publishing	21	27	57	48	32	40
33. Chemicals, etc.	106	485	572	321	167	402
34. Plastics and synthetics	3	146	211	48	28	398
35. Petroleum refining and related prod.	6	142	296	164	204	84
36. Rubber and misc. plastics products	257	153	143	210	591	860
37. Leather tanning, etc.	1,282	2	--	9	20	19
38. Glass, stone & clay products	18	1,770	580	285	353	761
39. Primary iron & steel mfg. & nonferrous mfg.	1	82	12,036	10,384	6,143	4,428
40. Fabricated metal products	34	207	1,190	1,719	2,147	2,209
41. Machinery, except electrical	1	56	1,037	1,539	6,293	1,522
42. Electrical equipment	8	77	446	524	2,607	6,571
43. Transportation equipment	--	4	105	379	1,073	332
44. Scientific instruments	13	13	23	202	188	689
45. Miscellaneous manufacturing	16	35	45	85	116	79
46. Transportation & warehousing	88	1,019	2,503	735	731	766
47. Communications & utilities	50	750	1,821	498	772	622
48. Wholesale & retail trade	133	501	1,643	1,172	1,843	1,941
49. Finance, ins. real estate & rental	87	341	660	569	972	746
50. Lodging, pers. & business services	167	340	611	608	1,031	1,927
51. Research & development	--	3	39	4	25	10
52. Auto repair	3	55	27	58	54	20
53. Amusements, med. & educ. services	7	18	54	38	51	55
54. Federal Govt. enterprises	13	18	29	28	45	101
55. State & local Govt. enterprises	--	18	28	9	4	7
56. Gross imports	367	458	3,331	447	1,273	1,110
57. Misc. industries	33	216	1,861	418	722	897
58. Government (general)	--	--	--	--	--	--
59. Rest of world	--	--	--	--	--	--
60. Household industry	--	--	--	--	--	--
Intermediate inputs, total	3,334	8,817	33,375	21,182	27,987	28,006
Value added	2,037	6,878	16,698	14,337	25,122	18,278
Total	5,371	15,695	50,073	35,519	53,109	46,284

1/ A row represents the industry's distribution of goods and services to the industries designated in the head of the columns. Hence, a column shows an industry's purchases from other industries.

continued--

Appendix table 2.--Interindustry transactions, 1967 1/--continued

(In millions of dollars at producers' prices)

Industry number & title	43	44	45	46	47	48
1. Cotton	--	6	--	--	--	--
2a. Wheat	--	--	--	5	--	--
2b. Rye	--	--	--	*	--	--
2c. Rice	--	--	--	1	--	--
3a. Corn	--	--	--	20	--	--
3b. Oats	--	--	--	1	--	--
3c. Barley	--	--	--	1	--	--
3d. Sorghum	--	--	--	1	--	--
4. Oil bearing crops	--	--	--	--	--	--
5. Livestock & livestock products	--	--	--	1	--	--
6. Other agricultural products	--	--	11	6	-	--
7. Ag. services, forestry & fisheries	--	--	5	1	--	247
8. Iron & ferroalloy ores	--	--	--	--	--	--
9. Nonferrous metal ores	--	2	--	--	4	--
10. Coal mining	35	3	1	28	653	5
11. Crude petroleum & natural gas	--	--	--	--	1,585	--
12. Stone & clay mining	--	--	--	2	--	6
13. Chemicals & fertilizer minerals	--	--	--	1	--	--
14. New construction	--	--	--	--	--	--
15. Maintenance & repair construction	198	4	27	1,575	1,227	986
16. Ordnance & accessories	594	89	1	--	--	6
17. Flour & other grain mill products	--	--	--	22	--	35
18. Prepared animal feeds	--	--	--	--	--	86
19. Rice milling	--	--	--	1	--	1
20. Wet corn milling	--	--	--	--	--	2
21. Bakery products	--	--	--	3	--	198
22. Misc. food and kindred products	--	2	14	34	--	138
23. Other food and kindred products	--	23	--	73	--	451
24. Tobacco manufactures	--	--	2	--	--	5
25. Broad, narrow fabrics, yarn thread mills	110	55	157	8	4	14
26. Misc. textile goods and floor coverings	206	12	59	20	7	39
27. Apparel	52	22	15	5	--	84
28. Misc. fabricated textile prod.	363	2	13	22	13	70
29. Lumber and wood products	266	8	171	33	4	243
30. Furniture and fixtures	143	29	12	--	--	42

31. Paper and allied products	267	211	541	53	39	1,301
32. Printing and publishing	45	4	43	86	164	343
33. Chemicals, etc.	454	224	165	109	17	388
34. Plastics and synthetics	141	21	221	--	3	5
35. Petroleum refining and related prod.	187	17	27	1,824	361	1,110
36. Rubber and misc. plastic products	1,760	113	350	358	24	419
37. Leather tanning, etc.	19	14	113	4	--	33
38. Glass, stone & clay products	844	138	56	12	35	367
39. Primary iron & steel mfg. & nonferrous mfg.	7,350	506	658	109	131	36
40. Fabricated metal products	4,659	313	282	73	235	344
41. Machinery, except electrical	3,643	364	79	207	20	447
42. Electrical equipment	3,052	676	152	210	283	326
43. Transportation equipment	17,362	194	31	611	9	405
44. Scientific instruments	791	661	14	38	--	144
45. Miscellaneous manufacturing	110	45	507	63	36	185
46. Transportation & warehousing	1,652	152	181	3,269	693	780
47. Communications & utilities	930	112	131	750	7,454	5,296
48. Wholesale & retail trade	2,316	439	561	1,217	425	2,436
49. Finance, ins. real estate & rental	770	198	256	2,638	809	10,222
50. Lodging, pers. & business services	1,884	392	303	847	874	8,540
51. Research & development	54	4	--	--	--	--
52. Auto repair	34	5	17	1,295	75	1,654
53. Amusements, med. & educ. services	91	11	11	79	537	344
54. Federal Govt. enterprises	98	12	15	61	542	1,367
55. State & local Govt. enterprises	15	--	2	921	3,646	567
56. Gross imports	1,690	496	822	1,470	--	--
57. Misc. industries	489	203	134	241	277	3,112
58. Government (general)	--	--	--	--	--	--
59. Rest of world	--	--	--	--	--	--
60. Household industry	--	--	--	--	--	--
Intermediate inputs, total	52,674	5,782	6,170	18,409	20,186	42,829
Value added	27,894	4,701	3,480	34,046	35,659	112,216
Total	80,568	10.483	9,650	52,455	55,845	155,045

* Less than $500,000.

1/ A row represents the industry's distribution of goods and services to the industries designated in the head of the columns. Hence, a column shows an industry's purchases from other industries.

continued--

Appendix table 2.--Interindustry transactions, 1967 1/--continued

(In millions of dollars at producers' prices)

Industry number & title	49	50	51	52	53	54
1. Cotton	165	--	--	--	--	428
2a. Wheat	445	--	--	--	--	60
2b. Rye	10	--	--	--	--	1
2c. Rice	39	--	--	--	--	*
3a. Corn	130	--	--	--	--	30
3b. Oats	117	--	--	--	--	6
3c. Barley	79	--	--	--	--	*
3d. Sorghum	96	--	--	--	--	-9
4. Oil bearing crops	172	--	--	--	--	--
5. Livestock & livestock products	1,245	--	--	--	13	--
6. Other agricultural products	346	--	--	--	20	3
7. Ag. services, forestry & fisheries	13	--	--	--	5	--
8. Iron & ferroalloy ores	8	--	--	--	--	4
9. Nonferrous metal ores	8	--	--	--	--	--
10. Coal mining	21	35	--	12	--	69
11. Crude petroleum & natural gas	172	--	2	--	--	--
12. Stone & clay mining	13	--	--	--	--	--
13. Chemicals & fertilizer minerals	2	--	--	--	--	--
14. New construction	--	--	--	--	--	--
15. Maintenance & repair construction	9,100	80	--	152	1,370	25
16. Ordnance & accessories	3	--	798	--	--	--
17. Flour & other grain mill products	3	--	--	--	52	114
18. Prepared animal feeds	4	8	--	--	61	--
19. Rice milling	--	--	--	--	2	67
20. Wet corn milling	1	12	--	--	--	--
21. Bakery products	5	--	--	--	10	--
22. Misc. food and kindred products	14	--	2	--	25	28
23. Other food and kindred products	72	--	6	--	158	277
24. Tobacco manufactures	3	--	--	--	--	--
25. Broad, narrow fabrics, yarn thread mills	23	169	2	--	3	--
26. Misc. textile goods and floor coverings	42	53	5	23	45	--
27. Apparel	39	142	2	1	65	--
28. Misc. fabricated textile prod.	58	242	6	29	75	4
29. Lumber and wood products	40	7	--	--	5	--
30. Furniture and fixtures	6	20	--	--	--	--

31. Paper and allied products	220	338	16	6	186	58
32. Printing and publishing	620	7,026	--	13	529	61
33. Chemicals, etc.	185	445	186	98	1,001	--
34. Plastics and synthetics	18	--	15	--	--	--
35. Petroleum refining and related prod.	659	340	32	36	120	10
36. Rubber and misc. plastic products	162	210	56	423	124	2
37. Leather tanning, etc.	10	10	--	--	23	2
38. Glass, stone & clay products	40	79	2	195	10	22
39. Primary iron & steel mfg. & nonferrous mfg.	47	30	31	--	--	--
40. Fabricated metal products	37	42	66	163	35	5
41. Machinery, except electrical	194	1,430	409	172	6	2
42. Electrical equipment	84	586	1,757	239	42	2
43. Transportation equipment	64	40	2,663	1,407	34	14
44. Scientific instruments	23	600	283	26	701	--
45. Miscellaneous manufacturing	56	740	18	3	210	--
46. Transportation & warehousing	1,160	353	4	128	299	1,585
47. Communications & utilities	2,197	5,413	5	413	1,646	211
48. Wholesale & retail trade	1,924	1,279	20	909	801	105
49. Finance, ins. real estate & rental	18,358	3,344	36	884	4,612	98
50. Lodging, pers. & business services	5,224	2,318	47	293	2,054	133
51. Research & development	--	--	--	--	74	2
52. Auto repair	374	410	--	234	104	79
53. Amusements, med. & educ. services	477	78	1,072	13	3,274	--
54. Federal Govt. enterprises	788	818	--	5	28	9
55. State & local Govt. enterprises	726	36	--	31	22	2
56. Gross imports	--	--	--	--	234	--
57. Misc. industries	897	969	30	150	1,074	102
58. Government (general)	--	--	--	--	--	--
59. Rest of world	--	--	--	--	--	--
60. Household industry	--	--	--	--	--	--
Intermediate inputs, total	47,038	27,702	7,571	6,058	19,152	3,611
Value added	113,688	34,483	1,854	6,240	37,445	3,681
Total	160,726	62,185	9,425	12,298	56,597	7,292

* Less than $500,000

1/ A row represents the industry's distribution of goods and services to the industries designated in the head of the columns. Hence a column shows an industry's purchases from other industries.

continued--

Appendix table 2.--Interindustry transactions, 1967 1/--continued

(In millions of dollars at producers' prices)

Industry number and title	55	56	57	58	59	60
1. Cotton	--	--	--	--	--	--
2a. Wheat	--	--	--	--	--	--
2b. Rye	--	--	--	--	--	--
2c. Rice	--	--	--	--	--	--
3a. Corn	--	--	--	--	--	--
3b. Oats	--	--	--	--	--	--
3c. Barley	--	--	--	--	--	--
3d. Sorghum	--	--	--	--	--	--
4. Oil bearing crops	--	--	--	--	--	--
5. Livestock & livestock products	--	--	34	--	--	--
6. Other agricultural products	--	--	103	--	--	--
7. Ag. services, forestry & fisheries	2	--	24	--	--	--
8. Iron & ferroalloy ores	--	--	--	--	--	--
9. Nonferrous metal ores	--	--	--	--	--	--
10. Coal mining	116	--	--	--	--	--
11. Crude petroleum & natural gas	33	--	--	--	--	--
12. Stone & clay mining	--	--	--	--	--	--
13. Chemicals & fertilizer minerals	--	--	--	--	--	--
14. New construction	--	--	--	--	--	--
15. Maintenance & repair construction	2,104	--	--	--	--	--
16. Ordnance & accessories	--	--	3	--	--	--
17. Flour & other grain mill products	--	--	88	--	--	--
18. Prepared animal feeds	--	--	--	--	--	--
19. Rice milling	--	--	6	--	--	--
20. Wet corn milling	--	--	--	--	--	--
21. Bakery products	--	--	118	--	--	--
22. Misc. food and kindred products	2	--	192	--	--	--
23. Other food and kindred products	--	--	2,948	--	--	--
24. Tobacco manufactures	--	--	238	--	--	--
25. Broad, narrow fabrics, yarn thread mills	--	--	124	--	--	--
26. Misc. textile goods and floor coverings	4	--	--	--	--	--
27. Apparel	3	--	25	--	--	--
28. Misc. fabricated textile prod.	--	--	4	--	--	--
29. Lumber and wood products	--	--	3	--	--	--
30. Furniture and fixtures	--	--	--	--	--	--

31. Paper and allied products	4	--	576	--	--	--
32. Printing and publishing	19	--	1,226	--	--	--
33. Chemicals, etc.	47	--	67	--	--	--
34. Plastics and synthetics	--	--	--	--	--	--
35. Petroleum refining and related prod.	67	--	15	--	--	--
36. Rubber and misc. plastic products	10	--	28	--	--	--
37. Leather tanning, etc.	--	--	44	--	--	--
38. Glass, stone & clay products	2	--	8	--	--	--
39. Primary iron & steel mfg. & nonferrous mfg.	3	--	385	--	--	--
40. Fabricated metal products	38	--	204	--	--	--
41. Machinery, except electrical	2	--	273	--	--	--
42. Electrical equipment	2	--	283	--	--	--
43. Transportation equipment	19	--	232	--	--	--
44. Scientific instruments	--	--	133	--	--	--
45. Miscellaneous manufacturing	--	--	451	--	--	--
46. Transportation & warehousing	152	--	5,228	--	--	--
47. Communications & utilities	1,007	--	--	--	--	--
48. Wholesale & retail trade	71	--	550	--	--	--
49. Finance, ins. real estate & rental	248	--	6	--	--	--
50. Lodging, pers. & business services	179	--	2,020	--	--	--
51. Research & development	--	--	--	--	--	--
52. Auto repair	11	--	--	--	--	--
53. Amusements, med. & educ. services	--	--	277	--	--	--
54. Federal Govt. enterprises	6	--	--	--	--	--
55. State & local Govt. enterprises	--	--	--	--	--	--
56. Gross imports	--	--	709	--	--	--
57. Misc. industries	79	--	--	--	--	--
58. Government (general)	--	--	--	--	--	--
59. Rest of world	--	--	--	--	--	--
60. Household industry						--
Intermediate inputs, total	4,230	--	16,625	--	--	--
Value added	4,268	--	10	84,844	4,580	4,292
Total	8,498	--	16,635	84,844	4,580	4,292

1/ A row represents the industry's distribution of goods and services to the industries designated in the head of the columns. Hence, a column shows an industry's purchases from other industries.

continued--

Industry number and title	Total intermediate output	Final demand	Total output
1. Cotton	2,060	-589	1,471
2a. Wheat	1,667	868	2,535
2b. Rye	40	3	43
2c. Rice	461	-7	454
3a. Corn	4,362	1,194	5,556
3b. Oats	683	-4	679
3c. Barley	440	32	472
3d. Sorghum	764	138	902
4. Oil bearing crops	2,138	817	2,955
5. Livestock & livestock crops	29,061	1,599	30,660
6. Other agricultural products	9,378	3,703	13,081
7. Ag. services, forestry & fisheries	3,361	139	3,500
8. Iron & ferroalloy ores	1,608	--	1,608
9. Nonferrous metal ores	1,890	104	1,994
10. Coal mining	2,582	86	2,668
11. Crude petroleum & natural gas	14,786	182	14,968
12. Stone & clay mining	2,370	2,897	5,267
13. Chemicals & fertilizer minerals	797	316	1,113
14. New construction	--	75,054	75,054
15. Maintenance & repair construction	18,664	5,499	24,163
16. Ordnance & accessories	1,764	7,833	9,597
17. Flour & other grain mill products	2,012	2,222	4,234
18. Prepared animal feeds	4,260	1,110	5,370
19. Rice milling	141	421	562
20. Wet corn milling	734	104	838
21. Bakery products	457	7,170	7,627
22. Misc. food and kindred products	4,211	6,618	10,829
23. Other food and kindred products	14,883	53,506	68,389
24. Tobacco manufactures	1,552	5,534	7,086
25. Broad, narrow fabrics, yarn thread mills	18,424	459	18,883
26. Misc. textile goods and floor coverings	3,227	1,749	4,976
27. Apparel	6,058	24,694	30,752
28. Misc. fabricated textile prod.	2,103	2,476	4,579
29. Lumber and wood products	11,824	473	12,297
30. Furniture and fixtures	1,545	6,677	8,222

31.	Paper and allied products	21,263	1,738	23,001
32.	Printing and publishing	13,513	7,789	21,302
33.	Chemicals, etc.	23,830	14,218	38,048
34.	Plastics and synthetics	8,313	250	8,563
35.	Petroleum refining and related prod.	12,760	12,412	25,172
36.	Rubber and misc. plastics products	9,750	4,137	13,887
37.	Leather tanning, etc.	1,780	3,591	5,371
38.	Glass stone, & clay products	13,721	1,974	15,695
39.	Primary iron & steel mfg. & nonferrous mfg.	48,961	1,112	50,073
40.	Fabricated metal products	28,192	7,327	35,519
41.	Machinery, except electrical	22,313	30,796	53,109
42.	Electrical equipment	21,318	24,966	46,284
43.	Transportation equipment	26,941	53,627	80,568
44.	Scientific instruments	5,361	5,122	10,483
45.	Miscellaneous manufacturing	4,065	5,585	9,650
46.	Transportation & warehousing	38,792	13,663	52,455
47.	Communications & utilities	37,291	18,554	55,845
48.	Wholesale & retail trade	40,624	114,421	155,045
49.	Finance, ins. real estate & rental	59,877	100,849	160,726
50.	Lodging, pers. & business services	46,397	15,788	62,185
51.	Research & development	324	9,101	9,425
52.	Auto repair	5,951	6,347	12,298
53.	Amusements, med. & educ. services	7,191	49,406	56,597
54.	Federal Govt. enterprises	4,456	2,836	7,292
55.	State & local Govt. enterprises	6,179	2,319	8,498
56.	Gross imports	26,671	-26,671	--
57.	Misc. industries	15,887	748	16,635
58.	Government (general)	--	84,844	84,844
59.	Rest or world	--	4,580	4,580
60.	Household industry	--	4,292	4,292
	Intermediate inputs, total	722,028		
	Value added		788,798	
	Total			1,510,826

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